

# POPULAR SCIENCE

Monthly

35¢ JULY

10 36-57

53

Gus Tricks a  
Trickster

Latest adventures  
of famous  
auto mechanic  
PAGE 198



Build Your Own

## FLYING CART—NO WHEELS

—PAGE 161

Copyrighted material



# Read About the Hospitalization Policy 50 Million Families Have Been Waiting For!

## NOW! HOSPITAL-MEDICAL-SURGICAL INSURANCE

**PAYS MONEY  
WHEN YOU'RE  
SICK!**



**GIVES MONEY  
BACK IF YOU  
STAY WELL!**



**Either Way  
You MUST Collect!**

### WHEN SICKNESS OR ACCIDENT STRIKES, YOU COLLECT GENEROUS BENEFITS!

With medical costs skyrocketing, only 1 person in 8 has enough hospitalization insurance. Now, a new kind of plan gives the CASH PROTECTION you need when you're sick or hurt. Specific benefits for doctors, hospital rooms, surgeon's fees, drugs, even medicine prescribed when you are out of the hospital. If you stay well and don't use all the benefits, you get a contingent CASH REFUND. The amount depends on the benefits you have already received, and the length of time the policy has been in force.

### STAY WELL AND GET CASH BACK!

Why shouldn't your hospitalization pay you money back if you stay well? Here's a plan that provides cash to help you pay the bills when you're sick or hurt—then, if you stay well you get money back. You can't lose. If you need the money, it's there to help you; if you don't, you've built a savings account of your own. This new kind of protection, policy NC-701, is available only from Bankers Life & Casualty Company as part of the famous White Cross Plan. Write today for your FREE BLUE BOOK that gives full details, tells six advantages never before combined in one policy. No obligation.

**GUARANTEED PROTECTION TO AGE 75** or until you have been paid the full amount of the principal sum in specified benefits.

**NOW** you can get the vital protection you need to help meet today's rising medical costs. Write for your FREE BLUE BOOK TODAY. Read how this policy cannot be cancelled even if you become a poor risk. Read how rates can't be raised EVER. Read how after 3 years you can build cash values as long as you pay the premiums. Read how you get the full face value of the policy either in specified benefits or in a contingent cash refund. Read about the generous payments specified for doctor, hospital room, drugs, surgery, etc. Read about the reasonable waiting periods and exceptions that help keep the cost low. Look over the BLUE BOOK in your own home, decide for yourself whether you want the one policy that guarantees you can't lose.

**FREE**

**Interesting  
BLUE  
BOOK**

**DETACH  
AND MAIL  
AIR-MAIL CARD AT LEFT**



**No Postage Needed—  
just drop it in the mail**

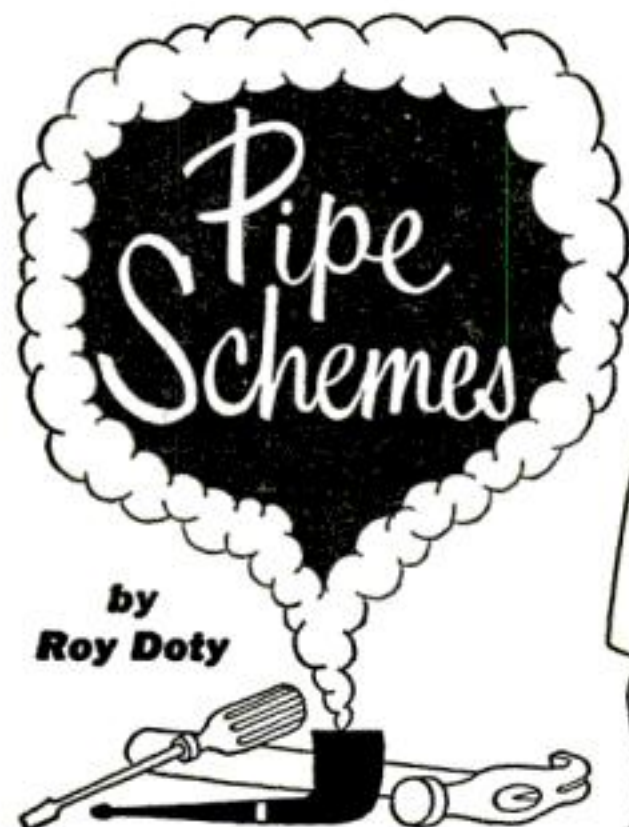
**THE WHITE CROSS PLAN** offered by **BANKERS LIFE & CASUALTY COMPANY**

An Old Line Legal Reserve Stock Co.

CHICAGO 30, ILLINOIS



**Win big prizes with one-evening projects! . . . Details below!**



## Now! Enter Old Briar's "Pipe Schemes" Contest! 110 Prizes . . . Every Month!

**First Prize**—\$249 DE WALT POWER SHOP! Does dozens of jobs easily.

**3 Second Prizes**—7 gallons STA-DRI ACRYLICOTE paint—for inside or outside use.

**6 Third Prizes**—\$24.95 Rotary Blade NORELCO SPEEDSHAVERS.

**100 Fourth Prizes**—Large can OLD BRIAR and a fine imported briar pipe.



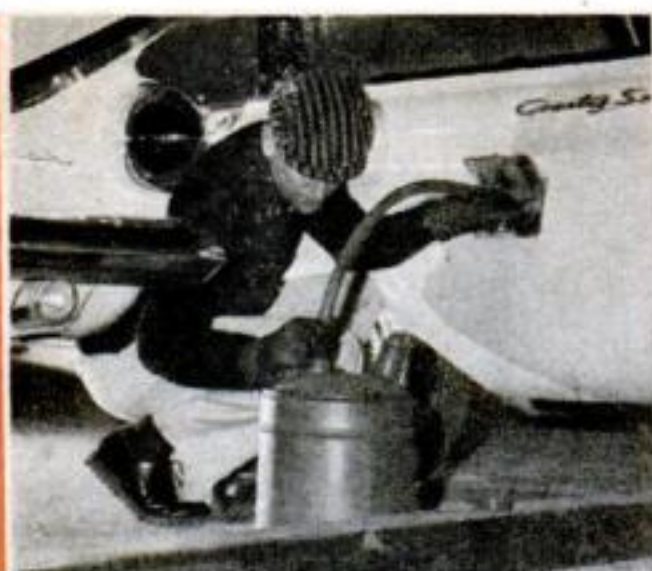
Old Briar mixture—rare flavor and aroma of Latakia, burleys and domestic favorites.

**EASY TO WIN!** Just build the above "Pipe Schemes" project—originality counts heavily! Then mail snapshot of your work plus your statement in 25 words or less on why you like Old Briar, the friendly pipe tobacco to: OLD BRIAR CONTEST, Box 3226, New York 17, N. Y. It must be postmarked July 31 or earlier! Contest to be judged by Popular Science.

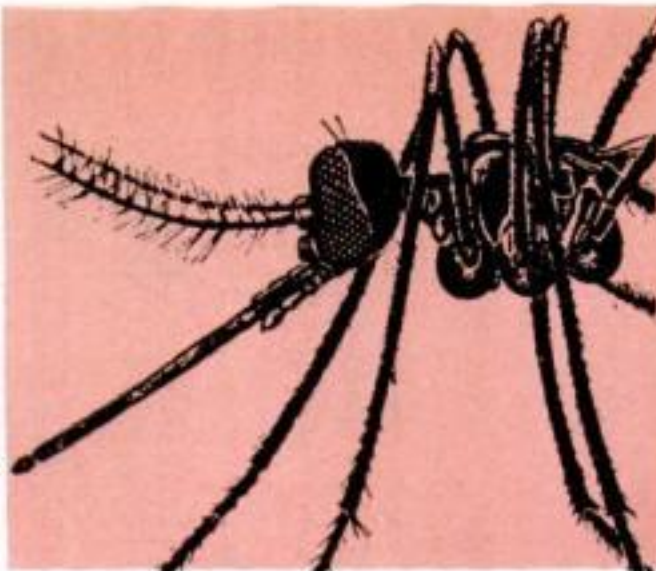
(Contest subject to all Federal, State and local regulations. Employees, and immediate families of advertiser, their agency or Popular Science staff are not eligible to enter. All entries become property of U. S. Tobacco Co. for any and all purposes and cannot be returned. Winners will be notified by mail by September 30, 1960.)

OLD BRIAR IS ANOTHER FINE PRODUCT OF UNITED STATES TOBACCO COMPANY





**Parking Gyps:** They trade on your trustfulness. P. 88



**Mosquito:** Hateful pest with a marvelous tool kit. P. 112



**For the Kids:** Lots of fun in the PS playhouse. P. 127

Founded in 1872 Vol. 177 No. 1

Mechanics and Handicraft REG. U. S. PAT. OFF.

# Popular Science

**July, 1960**

Cover photo by W. W. Morris

## CARS AND DRIVING

- Tiny Car Has Lots of Space..... 58
- Driving the Amphicar..... 60
- Air Conditioning for Small Autos.. 62
- How Parking-Lot Gyps Operate.... 88
- Jet Car Aims for 500 M.P.H..... 94
- Are Unmarked Police Cars Fair?.. 96

## DISCOVERIES AND INVENTIONS

*Full-Color Fold-Out:*

- Solaris, the Mechanical Crab.... 82
- How a Teleprompter Works.....104

## SCIENCE AND INDUSTRY

- Diesel Pile Driver Hits Fast..... 78
- Pesky but Remarkable Mosquito..112

## SPECIAL FEATURES

- Tanks That Walk and Jump..... 51
- Tunnel to Span English Channel.. 66
- 1960's Most Exciting TV Show.... 72
- Airmen Fly Treetop Missions.....108
- Straight Talk on Extra Lenses....179

## CONSUMER NEWS

- Skin Diving—Gear and Gadgets....102
- What's New.....114

## PICTURE NEWS

- Austin Gets Frog-Eyed Look..... 56
- Television Goes Underground..... 64
- Cops Shoot Crooks on Film..... 70
- Escape from a Sinking Car..... 76
- Fore-and-Aft Electric Car.....101
- Helicopter Rescues Helicopter....106
- Three-Tiered Boat Trailer.....118

**Editor** HOWARD ALLAWAY

**Assistant Managing Editors**

Kendall W. Goodwyn, Robert P. Stevenson

**Senior Editors**

Devon Francis, Martin Mann

Everett H. Ortner

**Technical Editor**

Hubert Luckett

**Detroit Editor**

Ken Fermoye

**West Coast Editor**

Wesley S. Griswold

**Managing Editor** FRANK ROWSOME JR.

**Associate Editors**

Erik H. Arctander, Alden P. Armagnac

Frank Dorr, Sheldon M. Gallagher

Herbert O. Johansen, Herbert R. Pfister

Joan Steen, Ruth Westphal

**Editorial Assistants**

Rosa Lee Beeland (Chief)

Anna Dallas, Bebe Lipson, Roberta Marks

Georgette Sparks, Dorothy Zallen

EDITORIAL OFFICES: 355 Lexington Ave., New York 17, N. Y.

**Art Director** HOWARD C. JENSEN

**Art Editors**

Herbert Anthony, Reginald A. Hawley

Harry Samuels

**Art Associates**

Bertrum Green, Eric A. Karminski Jr.

Henry W. Kazmirowski, Richard J. Meyer

**Photography**

W. W. Morris (Chief)

Robert D. Borst, Eugene Colangelo

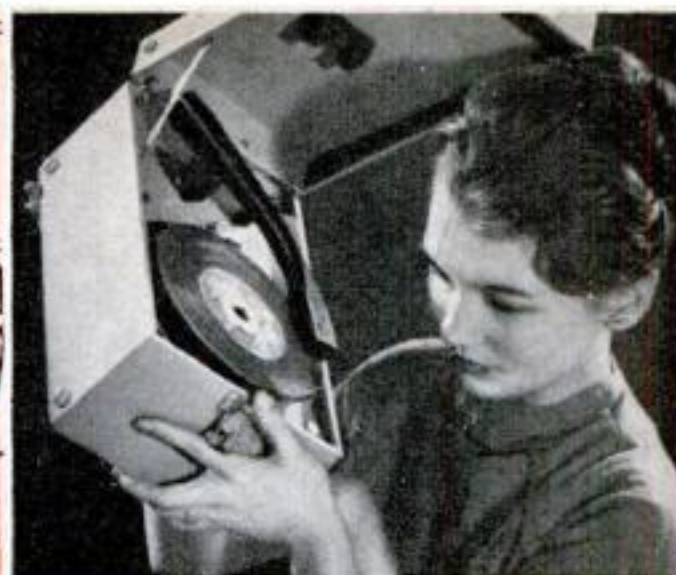




**Unmarked Police Cars:**  
*A sneaky trick? P. 96*



**Prompter:** *It feeds lines to the forgetful. P. 104*



**Phonograph:** *Build it! Play it! Love it! P. 142*

CONTENTS

# Monthly®

**America's  
NEW-IDEA MAGAZINE  
for 88 Years**

## FOR HOME AND SHOP

### *Bonus Blueprint:*

Building the PS Playhouse.....	127
One Machinist Tells Another.....	131
A Station-Wagon Bunk Bed.....	135
Ring-Toss Water Game.....	138
Making a Portable Phonograph..	142
20-Buck Dinghy for the Kids.....	147
Know-How: Removing Wallpaper	151
Camping Hints.....	156
How I Built the Flying Cart.....	161
Pop's Old Flying Machine.....	168
Powering the PS Kinderwagen....	172
Garden-Tool Caddy.....	176

## AUTO UPKEEP

A Remote-Control Car Mirror.....	178
Gus Tricks a Trickster.....	198
Hints from the Model Garage.....	204

## SHORT CUTS AND TIPS

Luggage Skate from Casters.....	134
Expendable Welding Vise.....	141
A Tight Seal for a Can.....	155
V-Rack for Files and Rasps.....	158
Dry Ice as a Plumbing Aid.....	159
Long-Reach Fruit Picker.....	160
Support for Low-Angle Photos....	160
Barbecue in a Wheelbarrow.....	166
How to Solder Transistors.....	167

## EVERY MONTH

PS Readers Talk Back.....	4
PS Puzzlers.....	18
The Month in Science.....	23
Detroit Report.....	46
I'd Like to See Them Make.....	57
New Ideas from the Inventors....	91
Wordless Workshop.....	136

**Publisher** EUGENE S. DUFFIELD

**Advertising Manager** LEE P. ADAMS

**Circulation Director** EUGENE WATSON

### ADVERTISING OFFICES:

NEW YORK—355 Lexington Ave.  
CHICAGO—360 North Michigan Ave.  
DETROIT—2810 Book Bldg.  
SAN FRANCISCO—114 Sansome St.  
CLEVELAND—636 B. F. Keith Bldg.  
LOS ANGELES—711 South Vermont  
PORTLAND, ORE.—520 S.W. Sixth Ave.

### SUBSCRIPTION SERVICE:

Address all subscriptions and correspondence concerning them to: Popular Science

Subscription Department, 355 Lexington Ave., New York 17, N. Y. Allow four weeks' notice for change of address. Please give both old and new addresses, including zone numbers. Published monthly at 355 Lexington Ave., New York 17, N.Y., by Popular Science Publishing Co., Inc., Godfrey Hammond, Chairman of the Board; Eugene S. Duffield, President; Franklin E. Parker Jr., Secretary; Eugene Watson, Vice-President; Robert D. Beals, Treasurer and Business Manager. Second-class postage paid at New York, N. Y.,

and at additional mailing offices. Entered as second class matter at the Post Office Department, Canada. Printed in U.S.A. Copyright © 1960 by Popular Science Publishing Co., Inc. All rights reserved. Single copy 35¢. Subscriptions to United States, its possessions, and Canada, 1 year \$3.40 (2 years \$6.00, 3 years \$8.00). Elsewhere, 1 year \$6.00 (2 years \$11.00, 3 years \$16.00). Send notice of undelivered copies on Form 3579 to Popular Science Monthly, 355 Lexington Avenue, New York 17, N. Y.



# PS Readers

## TALK BACK



### Those Stupid Speed Limits

I WOULD like to join the thousands who must be writing to congratulate you on Paul Kearney's article "Let's Abolish Stupid Speed Limits" [May].

I trust that the time is not too far distant when narrow-minded preoccupation with speed will no longer becloud the true issues.

DONALD E. WILLIAMSON  
Williamson Development Co.  
West Concord, Mass.

...Robert Moses' tart reply to Paul Kearney may apply to his outmoded parkways built for 1920 Sunday-afternoon drives. But it is better to drive at 70 on a safe, well-equipped turnpike than to stick below 40 on the old Hutchinson River Parkway.

The safety of a road is measured by how many decisions it compels a driver to make. In about every 40 decisions, an average driver will make one mistake, resulting in a scrape, a tight squeeze, or a bigger accident. On Mr. Moses' parkways—tight-laned, serpentine, sharp-curved slabs of concrete—drivers must make 10 times as many decisions as on the Connecticut Turnpike.

RONNIE YA DEAU, Leonia, N. J.

...I AM a driving instructor and I appreciate your courage in exposing the true killer on our highways—a killer that has been protected by advertising interests. Even our law-enforcement agencies feel the pressure of the brewery interests and are told to "take it easy" while thousands continue to die.

Perhaps your leadership will influence others in getting at the roots of our highway safety problem.

C. H. COURTNEY, Royal Oak, Mich.

...CHEERS for the piece on abolishing stupid speed limits. Kearney's statement, "Being tough with rational people never pays off as well as being reasonable," answers the politicians and officials who advocate unrealistic speed limits.

The killing agent is usually not speed but mechanical or human failure. If a person drives onto the N.Y. Thruway with a bald tire, reaches a speed of 60 m.p.h., has a blowout, and ends up splattered against a tree—is speed the cause of the accident?

The theory that speed kills has been spread in an attempt to avoid the problem by putting fear into a gullible public. I feel these limits will be abolished in short order by a more reasonable generation.

G. T. STARRS, Douglaston, N. Y.

### Who Says Editors Are Cream Puffs?

WHAT'S happened to PS lately? A while back, it seemed to me, you had begun to wander away from my particular interests, which mainly concern machinery and engineering, new inventions, and workshop stuff. Now you're right back on the beam—the last few issues have been tops.

Best thing was the three-part series on the new compact cars [Jan., Feb., March]. This was a whale of a job of imaginative, unbiased reporting. Incidentally, I was surprised to learn what a rugged bunch you are. I'd always pictured an editor as a quiet, wispy guy with a green eye



shade, shuffling papers at a desk. But racking up 10,000 miles apiece on the Corvair, Falcon, and Valiant—within the four weeks allotted to each car—certainly weeds out the boys from the men. Congratulations.

G. W. KENDRICK, Hempstead, N. Y.



# PICK YOUR OWN SUCCESS STORY FROM THIS PAGE

These are the true stories of people who seemed trapped in routine, low-pay shaky jobs. Handicapped by lack of proper training, they couldn't get the things they wanted out of life—more money, a job they liked, security and happiness.

They are a small sample of the thousands of men and women—young and old—who turn to I. C. S. for help. Their will-to-learn plus I. C. S. training have changed the course of their lives.

Are you discouraged with your job and pay and feel you can't improve yourself because of lack of specialized education? Well, these men and women were in the same boat. With I. C. S. training, one of these success stories could be about *you*.

**I. C. S.** is the oldest and largest correspondence school. 258 courses. Business, industrial, engineering, academic, high school. One for you. Direct, job-related. Bedrock facts and theory plus practical application. Complete lesson and answer service. No skimping. Diploma to graduates.



**Wins \$3000 contest**—"After my I. C. S. courses I secured a new position," says Mr. Cecil Rhodes. "My income has more than doubled and I recently won a \$3000 sales contest."



**From clerk to Assistant Estimator, thanks to I.C.S.** "Any way you look at it," writes Mrs. Edna James, "the time and money one spends for I. C. S. Courses will be repaid a thousandfold."



**"As a college graduate, I found I. C. S. very valuable."** Robert Lee took the I. C. S. Course in Advertising, is now Promotion Manager for a large corporation. "I. C. S. got me started on the way up," he says.



**From \$152 to \$395 a month**—"I.C.S. made my engineering work more interesting," Frank Bachtik tells us. "I was a Jr. Draftsman making \$152 a month. My present income is \$395.25 a month."

**3 FREE BOOKS**—a 36-page pocket-size guide to advancement, a gold mine of tips on "How to Succeed." Also a big catalog outlining opportunities in your field of interest and a sample I.C.S. lesson (Math.).

**For Real Job Security—Get an I. C. S. Diploma! I. C. S., Scranton 15, Penna.**

Accredited Member,  
National Home Study Council

## INTERNATIONAL CORRESPONDENCE SCHOOLS



**BOX 92659G, SCRANTON 15, PENNA.**

In Hawaii reply P. O. Box 418, Honolulu

(Partial list of courses)

Without cost or obligation, send me "HOW TO SUCCEED" and the opportunity booklet about the field BEFORE which I have marked X (plus sample lesson):

### ARCHITECTURE and BUILDING CONSTRUCTION

- ☐ Air Conditioning
- ☐ Architecture
- ☐ Arch. Drawing and Designing
- ☐ Building Contractor
- ☐ Building Estimator
- ☐ Carpenter Builder
- ☐ Carpentry and Millwork
- ☐ Carpenter Foreman
- ☐ Heating
- ☐ Painting Contractor
- ☐ Plumbing
- ☐ Reading Arch. Blueprints

### ART

- ☐ Commercial Art
- ☐ Magazine Illus.
- ☐ Show Card and Sign Lettering
- ☐ Sketching and Painting

### AUTOMOTIVE

- ☐ Automobile
- ☐ Auto Body Rebuilding and Refinishing
- ☐ Auto Engine Tuneup
- ☐ Auto Technician

### AVIATION

- ☐ Aero-Engineering Technology
- ☐ Aircraft & Engine Mechanic

### BUSINESS

- ☐ Accounting
- ☐ Advertising
- ☐ Business Administration
- ☐ Business Management
- ☐ Cost Accounting
- ☐ Creative Salesmanship
- ☐ Managing a Small Business
- ☐ Professional Secretary
- ☐ Public Accounting
- ☐ Purchasing Agent
- ☐ Salesmanship
- ☐ Salesmanship and Management
- ☐ Traffic Management

### CHEMICAL

- ☐ Analytical Chemistry
- ☐ Chemical Engineering
- ☐ Chem. Lab. Technician
- ☐ Elements of Nuclear Energy
- ☐ General Chemistry
- ☐ Natural Gas Prod. and Trans.
- ☐ Petroleum Prod. and Engr.
- ☐ Professional Engineer (Chem)
- ☐ Pulp and Paper Making

### CIVIL ENGINEERING

- ☐ Civil Engineering
- ☐ Construction Engineering
- ☐ Highway Engineering
- ☐ Professional Engineer (Civil)
- ☐ Reading Struc. Blueprints
- ☐ Sanitary Engineer
- ☐ Structural Engineering
- ☐ Surveying and Mapping

### DRAFTING

- ☐ Aircraft Drafting
- ☐ Architectural Drafting
- ☐ Drafting & Machine Design
- ☐ Electrical Drafting
- ☐ Mechanical Drafting
- ☐ Sheet Metal Drafting
- ☐ Structural Drafting

### ELECTRICAL

- ☐ Electrical Engineering
- ☐ Elec. Engr. Technician
- ☐ Elec. Light and Power
- ☐ Practical Electrician
- ☐ Practical Lineman
- ☐ Professional Engineer (Elec)

### HIGH SCHOOL

- ☐ High School Diploma

- ☐ Good English
- ☐ High School Mathematics
- ☐ High School Science
- ☐ Short Story Writing

### LEADERSHIP

- ☐ Industrial Foremanship
- ☐ Industrial Supervision
- ☐ Personnel-Labor Relations
- ☐ Supervision

### MECHANICAL and SHOP

- ☐ Diesel Engines
- ☐ Gas-Elec. Welding
- ☐ Industrial Engineering
- ☐ Industrial Instrumentation
- ☐ Industrial Metallurgy
- ☐ Industrial Safety
- ☐ Machine Shop Practice
- ☐ Mechanical Engineering
- ☐ Professional Engineer (Mech)
- ☐ Quality Control
- ☐ Reading Shop Blueprints
- ☐ Refrigeration and Air Conditioning
- ☐ Tool Design
- ☐ Tool Making

### RADIO, TELEVISION

- ☐ General Electronics Tech.

- ☐ Industrial Electronics
- ☐ Practical Radio-TV Eng'g
- ☐ Practical Telephony
- ☐ Radio-TV Servicing

### RAILROAD

- ☐ Car Inspector and Air Brake
- ☐ Diesel Electrician
- ☐ Diesel Engr. and Fireman
- ☐ Diesel Locomotive

### STEAM and DIESEL POWER

- ☐ Combustion Engineering
- ☐ Power Plant Engineer
- ☐ Stationary Diesel Engr.
- ☐ Stationary Fireman

### TEXTILE

- ☐ Carding and Spinning
- ☐ Cotton Manufacture
- ☐ Cotton Warping and Weaving
- ☐ Loom Fixing Technician
- ☐ Textile Designing
- ☐ Textile Finishing & Dyeing
- ☐ Throwing
- ☐ Warping and Weaving
- ☐ Worsted Manufacturing

Name \_\_\_\_\_ Age \_\_\_\_\_ Home Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_ Working Hours \_\_\_\_\_ A.M. to P.M. \_\_\_\_\_

Occupation \_\_\_\_\_ Canadian residents send coupon to International Correspondence Schools, Canadian, Ltd., Montreal, Canada. . . . Special low monthly tuition rates to members of the U. S. Armed Forces.





URANIUM ORE HAULER: L. E. Schooley, Grand Junction, Colorado. "Running on Firestone truck tires we travel over hot pavement and back-country trails without a worry!"



# COOL-RUNNING TIRES RUSH "HOT" LOADS OF VITAL URANIUM ORE FROM MINES TO MILLS!

## Firestone

*proved where profit depends on performance*

High speeds over hot pavement and "washboarding" over rutted wilderness trails are easy chores for Firestone truck tires. That's because Firestone tires undergo 425 million miles of test driving every year to prove they can take any job in stride. Testing like this has helped develop Shock-Fortified Cord and Firestone Rubber-X—the coolest-running and longest-wearing rubber ever used in Firestone tires. That's why, whenever profit depends on performance, truckers depend on Firestones for less cost-per-mile and on-time deliveries. If your trucking calls for tires that can take it, see your nearby Firestone Dealer or Store.

*Copyright 1960, The Firestone Tire & Rubber Co.*



Transport\*

Super Mileage Lug\*

Super All Traction\*

Rib Excavator\*

Rock Grip Excavator\*

All Traction\*

\*Firestone T.M.

*Here's owner proof of  
Firestone truck tire  
performance!*



**LIMESTONE HAULER:** Francis Couch, Ottawa, Kansas. "Hauling out of limestone quarries is tough on tires. You've got to have Firestones!"



**GRAVEL HAULER:** Merle G. Ellsworth, Bloomington, Illinois. "I give tires a real beating but Firestones keep me rolling even in the toughest kind of going!"



**HEATING CONTRACTOR:** T. M. McKee, Memphis, Tennessee. "Firestone tires are the best buy in my book. They save us from expensive on-the-job downtime due to tires!"



## Matey Conversations

As a former chief mate on merchant ships, I was delighted with the "turn signals" for ships, invented in the Netherlands ["Picture News," April, p. 77]. So simple and so sensible.

I have another suggestion to reduce confusion at sea: direct bridge-to-bridge radiophone communication between the mates on watch. Most ship's officers speak English today and a single standard frequency could be decided on internationally. The major cause of collisions, I believe, is that each ship tries to outguess the other instead of following the Rules of the Road. A mate-to-mate talk while ships are still 10 miles apart would eliminate the guesswork.

ERIC MAXWELL, NYC.

## Bicycle Built for One

Do you realize that in giving plans for making a second seat for a child on a bicycle ["Wordless Workshop," April], you are encouraging people to break the law—and their necks? Many states and



all the Canadian provinces have outlawed riding double on bikes.

J. A. HILL, Willard, Ont.

## Out Go the Solar Cells

I REALLY enjoyed building your space-age crystal set [Jan.] and showing it off to friends and relatives. I have discovered a better electrical source—a nine-volt transistor battery. Substituting the battery for the solar cells gives four times better sound reception.

JACOB REEFER, Chicago.

## Wooden Hinge Designed by Pioneers

THE letter about the furniture locks used by Colonials [May] made me think you might be interested in hinges used in the Old West.

The early settlers of the West sometimes had to use material at hand. Instead of driving 10 miles by oxcart to the

nearest general store, they used wood to turn out hinges for doors and gates. The miniature pair enclosed are just like the big ones used on the door of a log house I lived in when a small boy. I am 85 years old and I've had lots of fun getting folks to figure out what these hinges are and how they were used.



W. M. NEWLIN, Excelsior Springs, Mo.

## Mr. Rabinow and His Clutch

THERE is an amusing aspect to British acceptance of the Rabinow clutch ["New Shift Uses Magnetic Clutches," April] in the Hillman. The domestic rights to the Rabinow clutch are assigned to the U. S. Government. Because of this, any American car maker has royalty-free access to the patents. It has taken a foreign manufacturer, who must pay for the rights, to use the clutch in its most obvious application. Incidentally, the patents cover the dry-powder version, too.

Mr. Rabinow is no longer with the National Bureau of Standards, but has formed his own electronic and electro-mechanical engineering firm. This prolific inventor now has 62 patents in several fields. The automatic regulator, now a part of almost every American automobile clock, is a Rabinow invention.

A. O. MORSE, Kensington, Md.

## Converter or Inverter

IN "PICTURE NEWS" [March, p. 117], you state that a converter supplies 115-volt current from the 28-volt system of a Northeast Orient Airline Stratocruiser to operate an organ. A converter changes AC to DC. An inverter changes DC to AC.

C. F. LEHMAN, NAS, Miramar, Calif.

## Citizens of Outer Space

TALKING about extra-terrestrials ["U. S. Begins Search for Beings in Other Worlds," April]: Isn't it possible that any such creatures would have developed communications different from ours and thus would be unable to receive or send radio signals? If—as you say—some are more highly developed than we, that old standby of science fiction, telepathy,

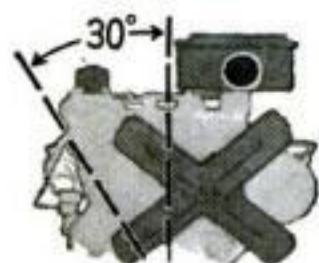


# Mobilgas Economy Run proves more car and more economy go together... if it's a 1960 car from Chrysler Corporation

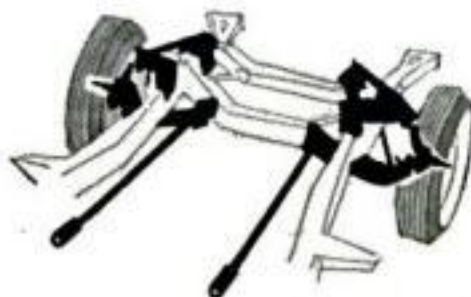
## CHRYSLER CORPORATION CARS WIN IT BIG IN THE 1960 MOBILGAS ECONOMY RUN



Compact class	2nd Place—	<b>VALIANT</b> .....	27.29 MPG
6-cyl. low price class	1st Place—	<b>PLYMOUTH</b> .....	24.82 MPG
	2nd Place—	<b>DODGE DART</b> .....	24.74 MPG
	3rd Place—	<b>PLYMOUTH</b> .....	24.73 MPG
8-cyl. low price class	1st Place—	<b>PLYMOUTH</b> .....	22.88 MPG
	2nd Place—	<b>PLYMOUTH</b> .....	22.52 MPG
	3rd Place—	<b>DODGE DART</b> .....	22.28 MPG
Low medium price class	2nd Place—	<b>DODGE</b> .....	21.12 MPG
Upper medium price class	1st Place—	<b>CHRYSLER New Yorker</b> .....	20.87 MPG
	2nd Place—	<b>DE SOTO</b> .....	20.36 MPG
High price class	1st Place—	<b>IMPERIAL</b> .....	20.50 MPG



**More car . . .** New Economy Slant "6," with intake and exhaust pipes for each cylinder, delivers 20% more passing power, yet uses 12% less gas than last year's models.



**More car . . .** Torsion-Aire Ride irons out the bumps. Up front, torsion bars twist and untwist, hold wheels down. In back, leaf springs soak up bounce and pitch, help prevent seesawing.



**More car . . .** Unibody Construction, the better way to build cars, welds away squeaks and rattles, surrounds you with a solid, one-piece structure twice as strong as earlier construction.

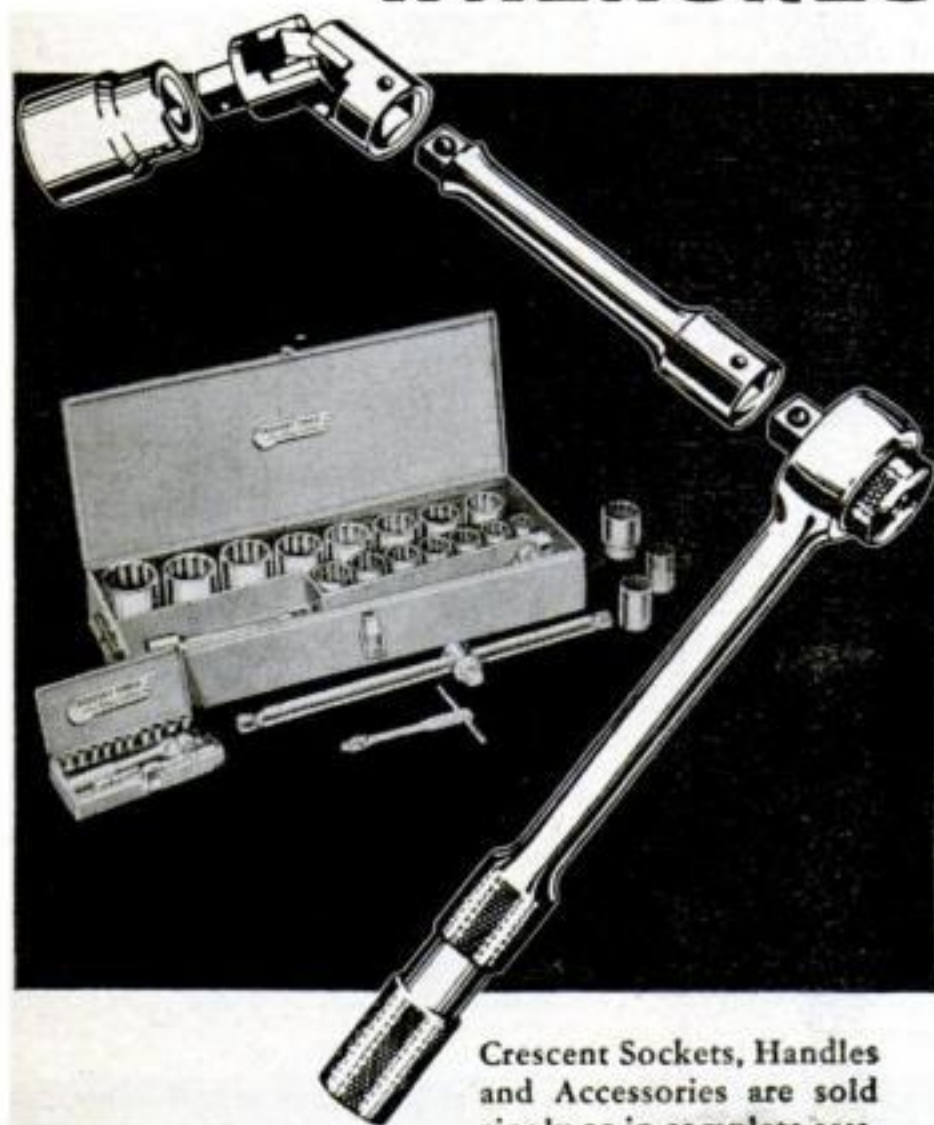
*Pure automobile . . . The Quick, the Strong, and the Quiet*

**from CHRYSLER CORPORATION**

**VALIANT • PLYMOUTH • DODGE DART • DODGE • DE SOTO • CHRYSLER • IMPERIAL**



# CRESCENT FOR TOP VALUE IN SOCKET WRENCHES



Crescent Sockets, Handles and Accessories are sold singly or in complete sets.

Here's world-famous Crescent Quality in a moderately priced line of Socket Wrenches. All popular sizes. Fifteen set combinations:  $\frac{1}{4}$ ",  $\frac{3}{8}$ ",  $\frac{1}{2}$ " and  $\frac{3}{4}$ " square drives; 6, 8 and 12 point sockets; standard and deep types, and a variety of handles, drives and attachments. Precision machined from alloy steel, permitting thinner than average side walls with no sacrifice of strength. Chrome-plated... loaded with utility features.

*Sold by Hardware Dealers everywhere.*



Crescent is our trade-mark, registered in the United States and abroad, for wrenches and other tools. Sold by leading distributors and retailers everywhere and made only by

**CRESCENT TOOL COMPANY, JAMESTOWN, N. Y.**

would be a possibility; or perhaps something completely unknown to humans.

RAND RINTOUL, Arnprior, Ont.

Since telepathy, if it exists, is only imperfectly developed here, scientists could hope that supersmart extra-terrestrials would recognize our backwardness and talk to us the old-fashioned way—by radio.

## Back-Seat Peril

THE inventor of the crash seat that slides back upon engine impact ["New Ideas from the Inventors," May] seems



to have forgotten about the passengers in the back seat. The way you picture it, they're going to get clobbered.

P. S. KIRSHENBAUM, Brooklyn, N. Y.

## And It Worked

MY COMPLIMENTS on the high quality of Joseph Whitehill's article ["Ball-Turning Attachment for a Lathe," March]. The blueprint was so interesting and instructive that I immediately set to work. The device worked exactly as you said it would.

R. H. TYRRELL, Oakland, Calif.

## Verse from the Past

READERS of "PS Puzzlers" [May] may be amused by this solution Lewis Carroll received to his problem of the Old and the Young Knight:

*The elder and the younger knight,  
They sallied forth at three;  
How far they went on level ground  
It matters not to me;  
What time they reached the foot of hill,  
When they began to mount,  
Are problems which I hold to be  
Of very small account.*

*The moment that each waved his hat  
Upon the topmost peak—  
To trivial query such as this  
No answer will I seek.  
Yet can I tell the distance well*



# LEARN ACCOUNTING

*for a*  
**BETTER  
JOB**

**...MORE MONEY**



**A SHORT STREAMLINED COURSE TO PREPARE YOU QUICKLY  
FOR YOUR START IN A SUCCESSFUL ACCOUNTING CAREER!**

**Free Sample Lesson Will PROVE You Can Master The Training**

You need no special talents to be a success in Accounting. You do not even need a preliminary knowledge of bookkeeping. All you need is the will to win—the will to work—and if you apply yourself you, too, can get into the permanent bigger-money class.

Demand for Trained Bookkeepers and Accountants far exceeds the supply—and this demand is increasing every day. A capable accountant should never have any trouble getting a job—and at better than average earnings.

### **We Guide You Step By Step**

Through more than 50 years' experience in training hundreds of thousands of successful accountants, including nearly 5,000 CPA's, we have developed through the LaSalle problem method a practical training in sound accounting principles and practices designed to prepare you rapidly for countless numbers of high paying bookkeeping and accounting positions.

The success of LaSalle accounting graduates has resulted from their knowledge and application of the principles acquired thru Basic and Practical Accounting, Principles of Accounting and Cost Accounting training, offered in our step-by-step accounting program.

Federal Income Tax is included to give you the necessary training to qualify for the many opportunities available to bookkeepers

**ACCREDITED MEMBER  
NATIONAL HOME STUDY COUNCIL**

and accountants with this valuable knowledge.

Success in mastering the training is assured through the guidance of expert accountants and CPA instructors. You complete the lessons right in your own home, in your spare time, advancing as rapidly as your time and ability permit.

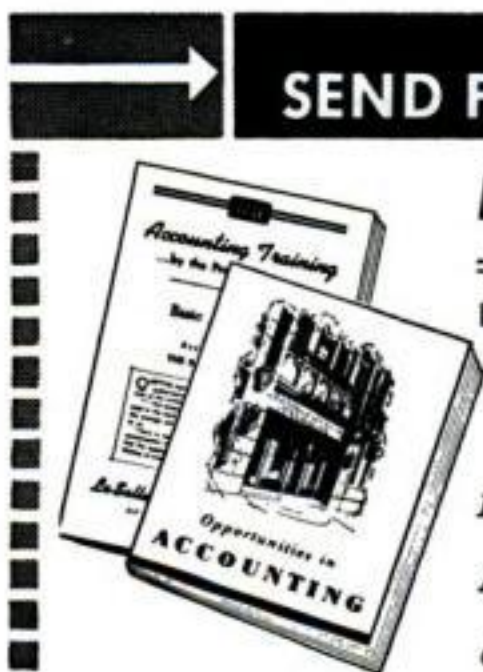
### **Send For Sample Lesson And Free Book, "Opportunities In Accounting"**

Send the coupon today—our FREE booklet "Opportunities in Accounting" will be sent promptly along with a sample lesson. It explains fully how we train you from the ground up—or from where you are now—according to your individual needs.

Get all the facts. The cost is low—terms easy. Don't pass this page without tearing out the coupon and mailing it promptly. It can be the means of your success—more money—a better job. Get our FREE booklets and judge for yourself.

**LEU**

**SEND FOR FREE BOOK**



### **LaSalle Extension University**

**—A Correspondence Institution—**

**Dept. 783H, 417 S. Dearborn St., Chicago 5, Ill.**

Please send me, free of all cost or obligation, a sample lesson in Accounting...also, your latest illustrated book, "Opportunities in Accounting."

Name.....Age.....

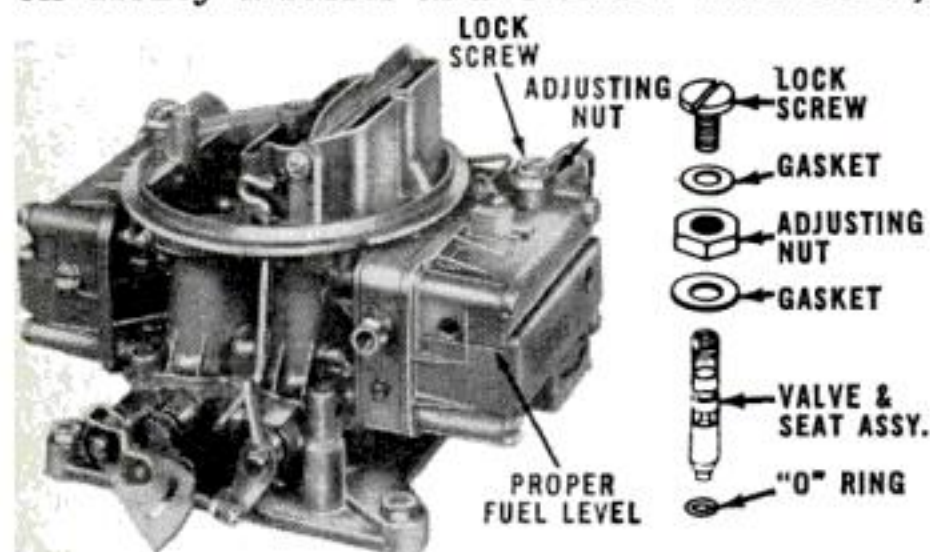
Address.....

City, Zone, State.....



# ONE SIMPLE ADJUSTMENT TO YOUR HOLLEY CARBURETOR

If you are getting poor idle or unsatisfactory fuel economy, one cause may be improper fuel level in the bowl. Because of the accessibility of the adjustable needle and seat arrangement on Holley 2-barrel and 4-barrel carburetors,



it's a simple matter to check the fuel level. Here are the easy steps: (1) Make sure the car is on level ground, then start the engine. (2) Remove the sight plug to check the fuel level in the bowl. (It should just reach the lower lip of the sight plug.) (3) If the level is too high or too low, loosen the lock screw with a screwdriver. Turn the adjustment nut clockwise to lower the fuel level—counter-clockwise to raise it. A  $1/6$  turn is the equivalent of  $1/16$ -inch wet fuel level in the bowl. (4) Operate the engine until the fuel level is stabilized, then recheck level at the sight plug. Be sure to replace the sight plug. This adjustable needle and seat arrangement is one of many important developments of Holley's continuous research and engineering. There are, of course, other causes of unsatisfactory idle and economy. If this simple adjustment does not correct the trouble, your Holley dealer will be glad to make a thorough check of the carburetor.

★ ★ ★

When you make your own carburetor or ignition repairs and parts are required, be sure to use *genuine* Holley parts. Your Authorized Holley Distributor or Dealer, listed in the Yellow Pages, has a complete stock of Holley carburetor minor over-haul kits, tune-up kits, ignition parts, and brand-new replacement carburetors priced competitively with rebuilds. All are engineered and built to exacting *original equipment standards*. It will pay you to buy or specify Holley Parts.



THE  
COMPLETE LINE  
OF CARBURETION  
and  
IGNITION EQUIPMENT

C-1

11955 E. Nine Mile Road • Warren, Michigan  
ORIGINAL EQUIPMENT MANUFACTURERS FOR OVER 55 YEARS

*They must have travelled o'er:  
On hill and plain, 'twixt three and nine,  
The miles were twenty-four.*

*Four miles an hour their steady pace  
Along the level track,  
Three when they climbed—but six when  
they  
Came swiftly striding back  
Adown the hill; and little skill  
It needs, methinks, to show,  
Up hill and down together told,  
Four miles an hour they go.*

*For whether long or short the time  
Upon the hill they spent,  
Two thirds were passed in going up,  
One third in the descent.  
Two thirds at three, one third at six,  
If rightly reckoned o'er,  
Will make one whole at four—the tale  
Is tangled now no more.*  
JEAN OSTEND, Yonkers, N. Y.

## More on Stud Holes

HAS that letter writer [April] ever tried using a sharp bit and a doorknob for a brace to make stud holes for electric cable? In the first place, it would take a Hercules hours to drill through a stud in this manner. In the second place, if you string wire near the flooring, there is danger of nails being driven through the cable, causing a short circuit and a serious fire hazard. This could happen



when a workman installs new flooring or floor cabinets in the room above. In the third place, angular holes hold the cable in place and make a neat, safe job.

ROBERT NICHOLAS, Dorchester, Mass.

## Steel Balls and Pendulums

IN MAY, you agreed with a letter writer that two steel balls rolling in an inverted semicircle will always meet at the center regardless of their starting positions. I disagree.

The trough should be an inverted cycloid, not a semicircle. A cycloid is de-

CONTINUED



# "NOW

*per  
annum*

*paid  
quarterly*

## on your savings account...by mail! it's safe and more profitable"

*SAYS A. G. NEUMEYER,  
President,  
First Western Savings*



First Western Savings, Nevada's largest, and Southern Nevada's oldest savings association, operating under the savings and loan laws of the State of Nevada, is able to offer higher than average interest rates because we are located in the fastest growing area in the nation, where dollars are needed to finance our remarkable growth. We pay more for this money and in turn, because of our dynamic growth economy, earn more money on our lending program than would be possible in a slower growing area. Specifically, on December 6, 1959, the United States Census Bureau revealed that our area is growing at 4.1 times the Los Angeles rate, and 10.6 times the national rate!

The current interest paid to First Western savers is:  $5\frac{1}{2}\%$  per year on accounts of \$5,000 or more, and  $5\frac{1}{4}\%$  per year on all others.

We have paid substantially higher rates year in and year out to our more than 16,000 prudent savers from all fifty states and fifty-one foreign countries. In fact, this new rate follows 16 consecutive interest payments to First Western savers of 5% per year or more!

Saving by mail at First Western, is easy, and most profitable. We are no further away than your mail box. To open an account send check or money order. To transfer an account from your present financial institution, just send your passbook or certificate to us. We'll attend to all the details.

**Remember:** at First Western interest is paid quarterly on all accounts. Withdrawals have always been paid instantly. Airmail postage is prepaid both ways. Funds received by the 15th of any month earn from the 1st. \$1.00 opens an account.

*Mail funds to:*

**FIRST WESTERN SAVINGS**

AND LOAN ASSOCIATION, DEPT. G

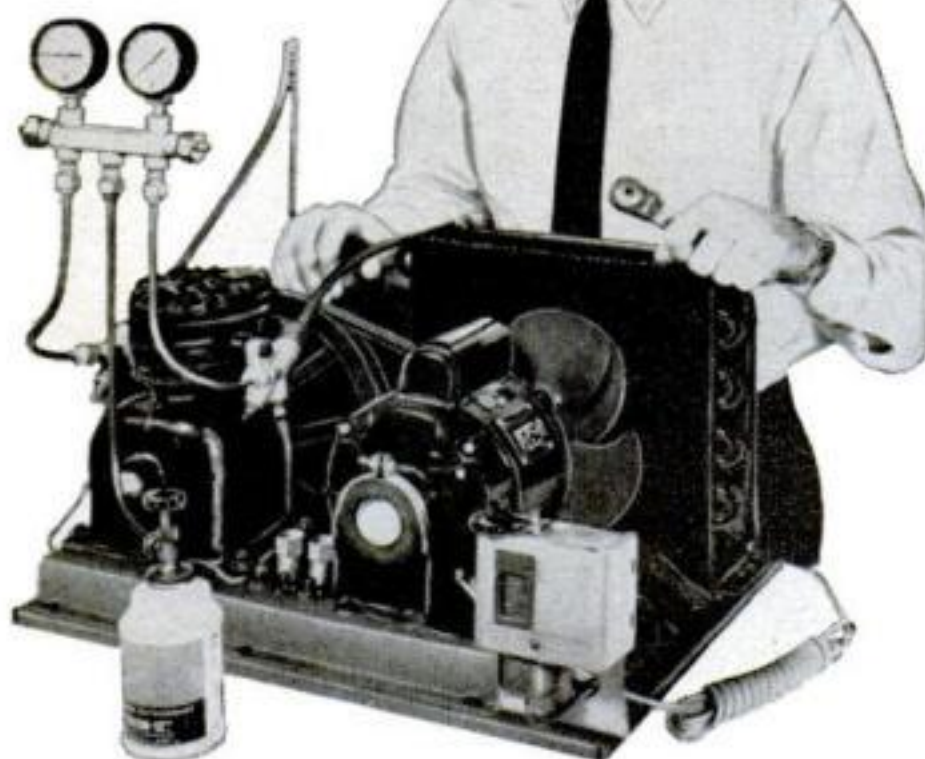
118 Las Vegas Blvd., South, Las Vegas, Nevada • A. G. Neumeyer, Pres.

RESOURCES OVER \$34,000,000.00





LEARN BY PRACTICING! YOU  
GET 25 KITS TO BUILD THIS  
HEAVY-DUTY CONDENSING UNIT



## It's easier to succeed in **Air Conditioning and Refrigeration— the uncrowded top-pay field**

Make no mistake about it: Your opportunities to make big money are best in the uncrowded air conditioning and refrigeration field. Judge for yourself! During a recent 6-month period, the production of commercial compressors increased 40%! Over 3 million refrigerators, freezers and air conditioners are sold yearly. Today more than 150 million units need maintenance. Experts say that 20,000 newly-trained technicians must enter the industry annually to fill top-pay jobs or to open service shops. **Learn at home in spare time by practicing.** CTI sends tools and parts to build a 1/4 hp commercial-quality condensing unit. You build a refrigerator, freezer, air conditioner or milk cooler. *Many students earn money fixing units while training.*

**Mail coupon for new catalog and lesson samples.** No cost nor obligation. See if air conditioning isn't really best for you—easiest to master—more loaded with big-job opportunities. Act now!—Commercial Trades Institute (a non-profit organization), Chicago 26, Ill.

### COMMERCIAL TRADES INSTITUTE

Dept. R-740

1400 GREENLEAF AVE. • CHICAGO 26, ILL.

Send booklets *Success in Air Conditioning & Refrigeration* and Lesson Samples. Both FREE.

Name \_\_\_\_\_ Age \_\_\_\_\_

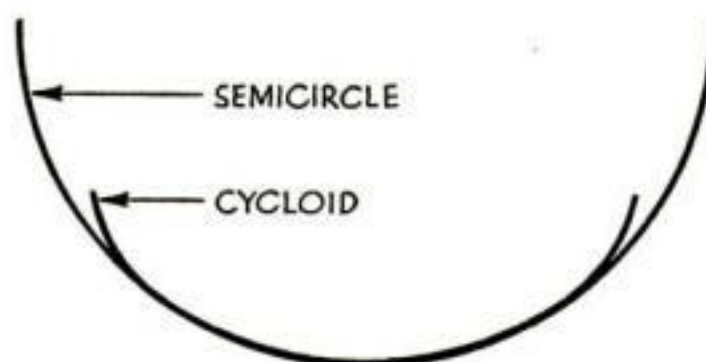
Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Accredited by National Home Study Council



defined as the locus of a fixed point on a given circle that rolls without slipping along a straight line. An inverted one will look like this:



It is a parametric curve—not the same curve as that of a circle.

A. L. JOHNSON, Royal Oak, Mich.

... WITH the pendulum illustrated in "Camera Catches Laws of Nature" [Feb.], "longer arcs—or shorter ones—take exactly the same time." But not at 90 degrees, as Mr. Karl suggests.

Increasing the amplitude (angle from rest position to extreme of swing) will increase the time required for a cycle. At 90 degrees, it would be increased 16 percent.

Also, for both balls simultaneously to reach dead center with their centers of gravity, the one released from a lower position, and traveling more slowly, would have to pass the center with its leading edge earlier than the other ball. If both are traveling in the same trough, the leading edges will meet on the side where the higher release was made.

R. P. SPIRO, Bronx, NYC.

### TV at Sea

WE ARE very pleased with your article on our S.S. France ["World's Biggest Liner," May] but have spotted an over-enthusiastic claim made for the vessel: "Every cabin will be air-conditioned and will have TV."

It is true that the entire ship will be air-conditioned, but the line never contemplated having TV in every room. Certain rooms might be equipped with closed-circuit TV sets just as certain rooms will be equipped with telephones.

PIERRE SIGNORAT  
French Line, NYC.

### Oiling a Diesel Crank

I've studied the diagrams on the new midget diesels [April], but there is still one thing that bugs me. Air is pulled

CONTINUED



**NOW...GET  
EVERYTHING  
YOU NEED TO  
PREPARE TO EARN  
REAL MONEY IN**

# ELECTRONICS

**From RADIO • TELEVISION • RADAR  
To GUIDED MISSILE CONTROL, etc.**

**One of  
Today's  
BRIGHTEST  
Opportunity Fields!**

Today's great Electronics field offers you a chance of a lifetime to prepare for highly interesting work and a wonderfully promising future! With so many new developments coming up in Electronics, opportunities for trained men were never brighter. Send coupon for details.

Right in your own home you may now get one of today's most interesting . . . **PRACTICAL WAYS** to prepare for a good job or your own business in Electronics. No previous technical experience or advanced education are needed! DeVry Tech brings you a unique **3-WAY COMBINATION** of texts, home movies and real equipment—the same type of basic equipment as found in our well-equipped Chicago and Toronto Laboratories.

**EMPLOYMENT SERVICE**  
... helps you get started toward a good job, or toward advancement in the company you now work for. **FREE** to all graduates.

**EARN WHILE YOU LEARN**  
DeVry Tech's practical program helps you to earn **EXTRA MONEY** in your spare time, servicing Radio and TV sets.

## Your Guide

### to PROFITABLE JOB OPPORTUNITIES

See how **YOU** may get ready for Jobs as:

**TV-Radio Broadcast Technician**  
**Color Television Specialist**  
**Radar Operator • Laboratory Technician**  
**Airline Radio Man • Computer Specialist**  
**Quality Control Manager**  
**Your Own Sales & Service Shop...PLUS MANY OTHERS**

**SEND FOR FREE BOOKLET!**

"One of North America's Foremost Electronics Training Centers"



Accredited Member of  
National Home  
Study Council

**DeVRY TECHNICAL  
INSTITUTE**  
CHICAGO 41, ILLINOIS

### 300 EXPERIMENTS

Build over 300 practical projects from many shipments of Radio-Electronic parts. You build and operate TV-Radio circuits . . . wireless microphone . . . and many other major projects—all designed to provide outstanding practical experience at home.



### HOME MOVIES

Thanks to this exclusive home training aid, many important fundamentals quickly become "movie clear." Now you can actually see electrons on the march and other "hidden actions"—a wonderful advantage that is almost like having a teacher at your side.



### BUILD YOUR OWN TEST EQUIPMENT

As part of your home laboratory projects, you **BUILD** and **KEEP** a fine quality 5-inch **COLOR OSCILLOSCOPE** and a Jewel Bearing **VACUUM TUBE VOLTMETER**. You will find this equipment ideal for helping you earn in your spare time while a student—and later when working full time in the field.



### BUILD AND KEEP A BIG 21-INCH TV SET

For added practical experience, you can also build and keep this quality 21-inch **TV SET** that provides TV reception at its finest (DeVry Tech also offers another home training without the TV set).



## MAIL COUPON TODAY!

**DeVRY TECHNICAL INSTITUTE**

4141 Belmont Avenue, Chicago 41, Ill., Dept. PS-7-Q

Please give me your **FREE** booklet, "Electronics in Space Travel," and tell me how I may prepare to enter one or more branches of Electronics.

Name \_\_\_\_\_ Age \_\_\_\_\_

PLEASE PRINT

Street \_\_\_\_\_ Apt. \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Canadian residents address: DeVry Tech of Canada, Ltd.  
970 Lawrence Avenue West, Toronto, Ontario

2046



# Coast photographer discovers oil!



Paul L. Stover, of Stover Studio, Oakland, discovered the world's richest, most complete motor oil—Pennzoil Z-7. And, to hear him talk, you'd think he had *struck* oil! He says:

"My last three cars each went over 100,000 miles with Pennzoil. My present car has 61,000 miles on it. And I haven't even had the head or pan off. That's pretty terrific lubrication protection!"

This amazing 100% pure Pennsylvania motor oil is so rich it gives double the protection demanded. So complete you never need extra additives. Contains special power ingredient Z-7 that keeps engine parts so clean the oil can give peak protection *full* time, with regular changes.

Your favorite dealer can supply you with Pennzoil Z-7. Ask for it by *name*—sound the "Z" that makes Penn Oil—PennZoil.

***Richest, most  
complete motor oil  
in the world***

Member Penn. Grade Crude Oil Assn.  
Permit No. 2, Oil City, Pa.



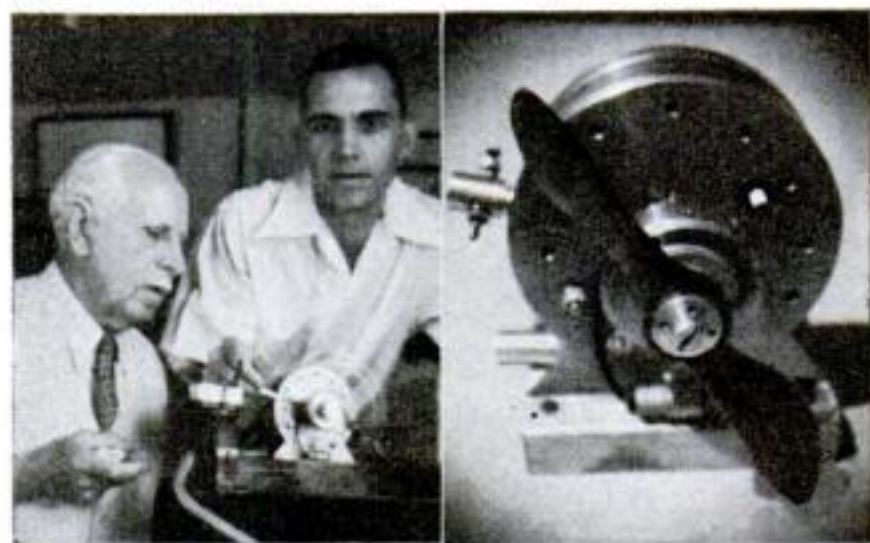
into the crankcase and then forced into the cylinder. What do they use to lubricate the crankshaft? And if they use oil, how do they prevent the oil from being sucked into the cylinder?

DONALD BRASSARD, Brunswick, Me.

*The engine has a separate metered lube-oil pump, with four outlets. Two lines are connected to the cylinder's thrust side, two to the crankcase, where they drip lube oil next to the bearing.*

## His Wankel Works

MY SON and I built this Wankel engine largely from descriptions—in PS



and a sports-car magazine—and it is running successfully.

We used brass cases and a steel rotor fitted to .0002-inch side clearance, so the only vanes are the three end sealers at the rotor apexes. The engine runs smoothly and shows no sign of binding after a five-minute run at 6,000 revs. A  $\frac{1}{16}$ -inch hole connects the plug chamber of the side-mounted plug to the combustion chamber, and the plug gap needs to be fairly large for good ignition. Balance is excellent.

W. W. THOMAS SR., Daytona Beach, Fla.

*We're delighted, and awed, that you were able to build a working machine from the scant information available. Congratulations on a remarkable job.*

## His Engine Was Missing

HAVE any other Falcon owners had the trouble that I have had—the engine missing in second gear? My dealer finally changed the jets in the carburetor, put in new plugs, and reset the timing. Now the car works fine, but I get only 18 m.p.g.

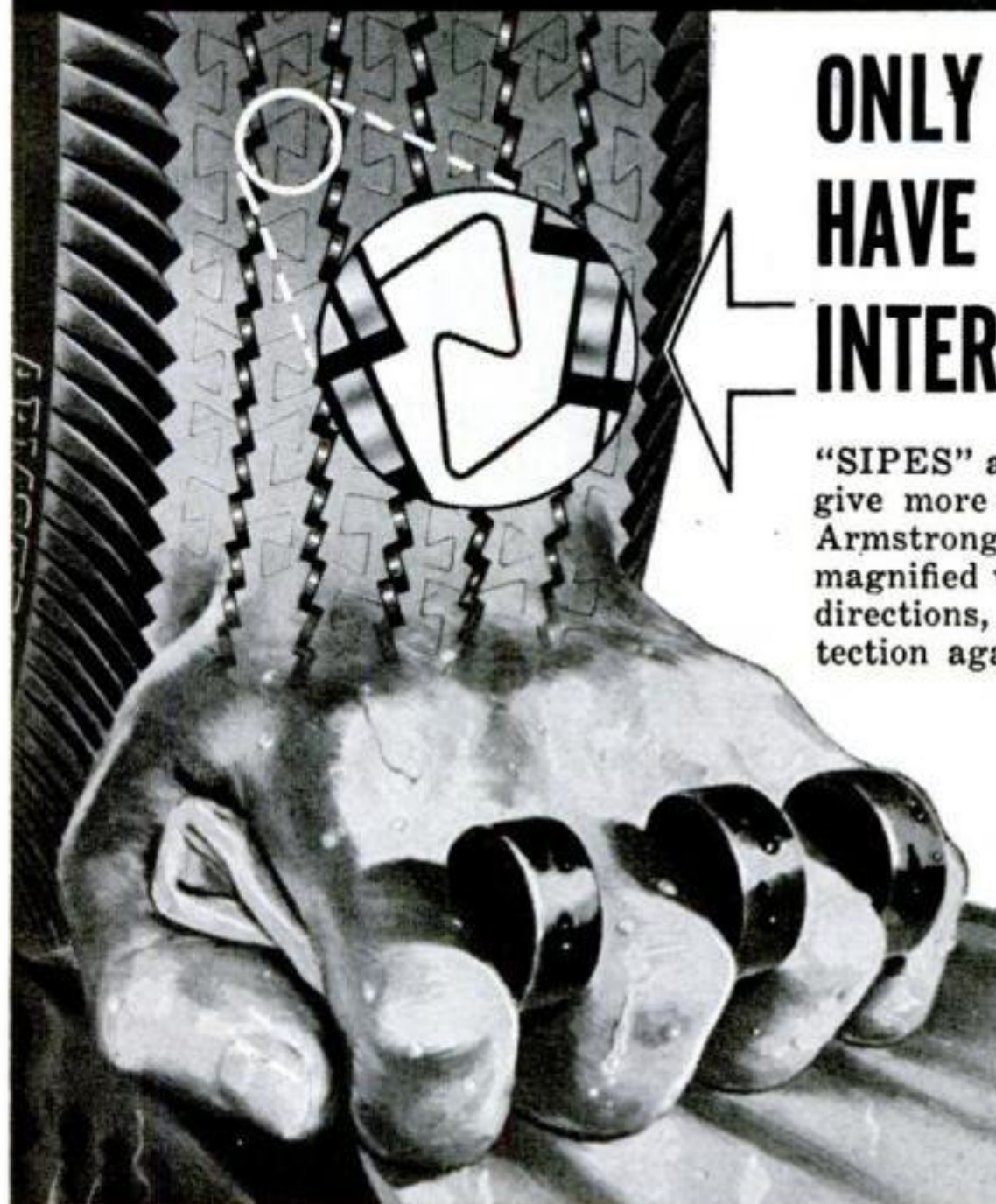
E. W. CHRISTMAN, Massillon, Ohio.

*As our February article indicated, all*

***[Continued on page 44]***



# TIRE FACTS THAT CAN SAVE YOUR LIFE



## ONLY ARMSTRONG TIRES HAVE PATENTED INTERLOCKING SIPES

"SIPES" are the slots put in a tire's tread to give more gripping edges, to stop skidding. Armstrong's interlocking, S-shape siping (see magnified view at left) provides grip in ALL directions, gives you sharply improved protection against both forward and side skids.

AND UNLIKE tires which have siping just cut into the tread, Armstrong siping is *molded* in, deeply. Long after the mileage that wears away the shallow siping of ordinary tires, Armstrong siping continues to give you full protection. Safeguard your car against deadly skids . . . compare, and see how Armstrong gives you far more siping than other leading tires.

## ONLY ARMSTRONG TIRES HAVE PATENTED SAFETY DISCS

*—Grip the road to  
stop deadly skids  
as no other  
tires can!*

### ARMSTRONG TIRES



#### TREAD STAYS OPEN

Like fist above with discs between fingers, tread CAN'T squeeze shut. Hundreds of Armstrong Safety Discs hold tread's gripping edges open, always ready to "bite."

### ORDINARY TIRES



#### TREAD CAN CLOSE

Without discs, tread CAN squeeze shut, like fist above. Tire's gripping edges are pushed together, lose their grip. Even brand new tires can go smooth like this . . . and you skid!

**ARMSTRONG RUBBER COMPANY**

Home Office, West Haven, Connecticut



# PS Puzzlers By Joan Steen

**Test your mental muscles . . . Answers on page 230**



## Do You Know the Riddle of the Sphinx?

**W**HAT is it that is four-footed, two-footed, and three-footed? According to Greek mythology, Oedipus knew, and so mortified the Sphinx that she threw herself over a cliff.

Myths and legends abound with such "temple" puzzles, where the gods act as oracles and challenge man to interpret their veiled sayings by solving a riddle. (What more proof do you want of man's inherent need to be "puzzled"?)

The tradition goes on, for here's a modern temple puzzle I heard recently.

The oracle in a certain temple answers the questions posed by the faithful through the mouths of three gods, whose identical images are set up in a row. Trouble is, no one's sure which god is which. One is the God of Truth, whose answers are always reliable. One is the God of Falsehood, whose answers never are. And the third, aptly called the God

of Diplomacy, sometimes speaks truly, sometimes not.

The priests, who know their identities, do a fine business of interpreting.

One day a poor beggar came to the temple and decided to try his luck in finding out which god was which. He asked the image seated at the left, "Which god sitteth next to thee?"

"The God of Truth," was the answer.

To the God in the center the beggar said, "Who art thou?"

"The God of Diplomacy."

Lastly, the beggar turned to the image on the right and asked, "Who sitteth next to thee?"

"The God of Falsehood," he said.

"O-ho," said the beggar, "so that's the way it is." And before long he set up shop in successful competition with the priests, for now he too knew which god was which.



**H**ERE'S a breather from some of the stickier puzzles I'm told I sick upon readers every month. (I protest I can't do them all, either!) These are "relative" problems—the first two are easy, the third you can probably make a good guess at.

1) Two fathers and two sons sit down to breakfast and divide three eggs among them (not by scrambling). How come?

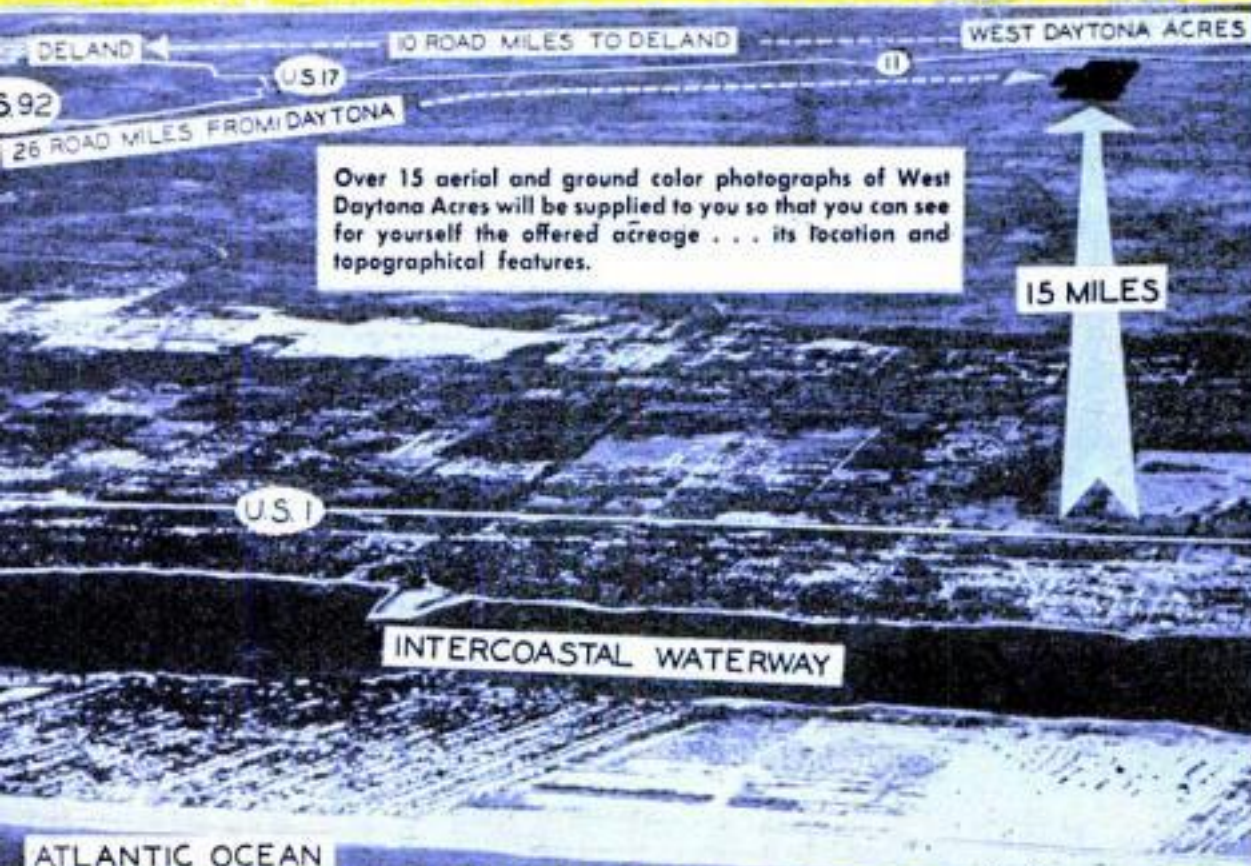
2) "Ugh," said the big Indian to the little Indian as they stood upon the peak. "You are my son, but I am not your father." How come?

3) This one's from Lewis Carroll: The Governor of Kgovnji wants to give a very



# NOW! A FLORIDA INVESTMENT YOU CAN MAKE WITH CONFIDENCE

## WEST DAYTONA ACRES <sup>17</sup>/<sub>17</sub> MILES FROM THE ATLANTIC OCEAN . . . IN THE HEART OF THE GOLDEN TRIANGLE



**1 1/4 ACRES  
TOTAL PRICE**

**\$495**

(165' X 330')

**\$10 DOWN  
MONTHLY**

- EACH TRACT APPROX. 54,450 SQ. FT. • NO CLOSING COSTS • 55' MEAN ELEVATION
- 100% OIL AND MINERAL RIGHTS • ABSOLUTELY MARKETABLE AND INSURABLE TITLE

**LOCATION** Let's face it! . . . your FLORIDA investment Dollars will be better spent WHEN THE LAND YOU BUY IS LOCATED IN AN AREA WITH PLENTY OF BASIC FLORIDA APPEAL . . . and WEST DAYTONA ACRES — just 26 road miles from world-famous DAYTONA BEACH and 10 road miles from Deland, the picturesque seat of renowned Volusia County and home of Stetson University . . . meets all the basic requirements!

### HERE ARE THE VITAL FACTS

- West Daytona Acres is located only 17 miles inland from the Atlantic Ocean and Daytona Beach, "The World's Safest Bathing Beach" . . . one of the great natural playgrounds of the world.
- West Daytona Acres is located in the Citrus growing area of Volusia County.
- West Daytona Acres has a mean elevation of 55 ft. (Source: Engineer's Report.)
- West Daytona Acres is located in the Golden Triangle, famous for the explosive growth of missile-connected industries within its boundaries.

When you buy FLORIDA REAL ESTATE as an investment for future profits . . . the MOST IMPORTANT SINGLE FACTOR TO CONSIDER IS THE NEARNESS OF THE PROPERTY TO AN ESTABLISHED AREA . . . where growth and expansion are now taking place.

At West Daytona Acres . . . the vital facts favor the investor . . . as KEY LOCATION IS THE PRIME POINT GOVERNING FUTURE PROFITS IN REAL ESTATE.

### WHY YOUR BEST INVESTMENT IS IN FLORIDA UNIMPROVED ACREAGE

Again, let's face it. Florida is attracting over 4100 new residents weekly. The Sunshine State is the fastest growing State in a Nation of unprecedented growth! We know, by substantiated statistics that people come to live and work in Florida for 2 BIG REASONS — CLIMATE AND HEALTH. The two go hand in hand, and the greater Daytona area, with a year round average temperature of 70.4 degrees, is one of the Sunshine State's most healthful.

Small wonder then, why there are over 1000 homes and homesite subdivisions within a 50 mile radius of West Daytona Acres.

### WEST DAYTONA ACRES IS NOT A HOMESITE SUBDIVISION

Rather, this virgin land is a speculative investment in the future growth of Florida, the growingest State in the Union. Like all acreage everywhere in Florida, some of West Daytona Acres is wet at times, and so it will remain, wet and dry, until improvement comes to this area of Volusia County. WHILE FLORIDA IS IN NO IMMEDIATE DANGER of running out of USABLE LAND, it MAKES GOOD INVESTMENT SENSE that the amazing influx of population and industry FOLLOWING THE SUN TO SUNNY FLORIDA are constantly forcing prices up . . . for land in established areas . . . through the simple law of SUPPLY AND DEMAND.



#### References:

DeLand Chamber of Commerce  
Daytona Beach Chamber of Commerce  
Miami-Dade Chamber of Commerce  
Hollywood-by-the-Sea Chamber of Commerce

Dory Auerbach Realty Company, Realtor

West Daytona Acres is located in the very heart of FLORIDA'S famed GOLDEN TRIANGLE which has gained national reputation because of the explosive expansion in population and industry within its boundaries. The Triangle comprises the land and coastal beaches between Jacksonville on the North, Orlando on its Western, inland base, and Melbourne on the South. Many of Florida's 100 plus electronic industries that have "followed the sun" to settle here in the past decade, have located in the Triangle to give logistic support to the nation's vast missile program. Some of the big, big reasons why the Sunshine State has increased its population 60% in eight years, are industrial expansion, in the fields of electronics, metalworking, chemicals, paper, plastics, construction and the garment fields. Coupled with the consistently fine climate, the location of West Daytona Acres . . . just 17 miles from the white, sandy shores of the Atlantic Ocean . . . is another BIG INVESTMENT ADVANTAGE YOU ENJOY.

**REMEMBER! . . . YOU TAKE NO RISK IN SENDING \$10 to reserve your 1 1/4 Acre Tract at West Daytona Acres. We will send you complete, certified information . . . that you can evaluate at your leisure. In fact, we INVITE COMPARISON — and ask — that YOU BE THE JUDGE! If you are not satisfied that this is an excellent investment opportunity, EVERY PENNY OF YOUR RESERVATION DEPOSIT WILL BE RETURNED WITHIN 60 DAYS FOR ANY REASON WHATSOEVER.**

### RUSH RESERVATION COUPON TODAY!

**WEST DAYTONA ACRES COMPANY**  
1939 Harrison Street  
Hollywood, Florida

PS 4101

*A Division of Firstamerica  
Development Corporation*

Enclosed is my \$10 reservation deposit on . . . 1 1/4 Acre Tracts. (Reserve as many as you wish.) Please rush complete details, including maps, photos, etc. I must be convinced that this is an excellent speculative Florida investment . . . or my reservation deposit will be refunded for any reason whatsoever, within 60 days.

NAME .....

ADDRESS .....

CITY ..... STATE .....

AD 60033



## PS Puzzlers continued

small dinner party, and he means to ask his father's brother-in-law, his brother's

father-in-law, his father-in-law's brother, and his brother-in-law's father. What do you suppose is the minimum number of guests possible?



ONE of Sam Loyd's most famous picture puzzles was "The Donkeys and the Riders." The problem: Cut the puzzle apart in three sections as shown, and fit the riders on the animals' backs in the normal way. No fair snipping the riders apart to seat them separately.

**W**ANT to compete with the Russians? Here's a sample question from an entrance exam for *nontechnical* Soviet college students. Not a puzzle, it simply tests basic science knowledge:

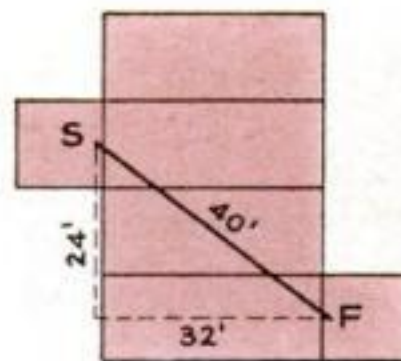
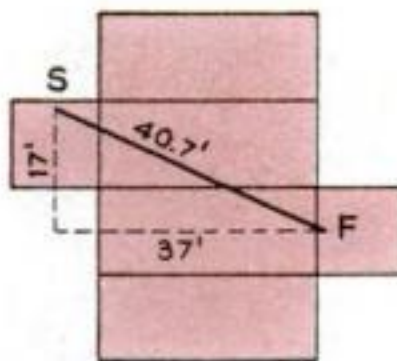
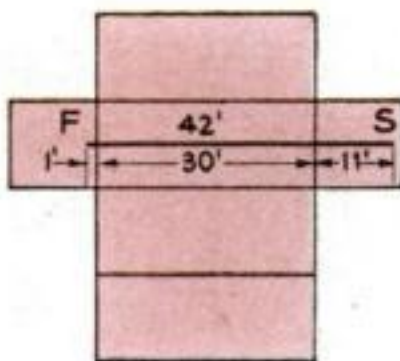
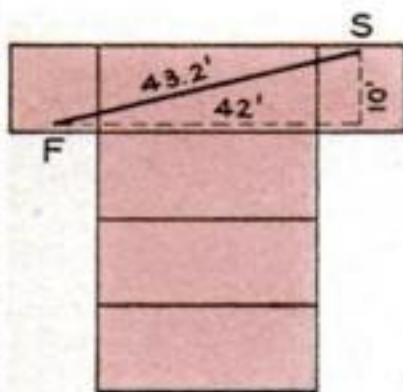
You have two steel bars, apparently identical, clinging together side by side.

"One of these," you are told, "is a powerful bar magnet. The other is soft steel. Using no outside equipment, you are to determine which is which. You may pull them apart, but may manipulate them only once—that is, put them in only one other position—before answering."

### Puzzle of the month

**T**RY playing your way to the solution of this month's P-O-T-M. You need two players and a number of counters (matchsticks, coins, whatever's handy). The game is "Nim," probably one of the simplest games ever invented. All you do is take turns picking up a number of the counters

(up to a fixed maximum). The idea is to make your opponent pick up the last one. He's the loser. Silly? Wait'll you start playing it. There's a neat strategy which, if you can figure it out, will always insure victory to the first player. Now to pin things down. Try 21 counters and make the maximum to be picked up at a turn five counters. (Answer next month.)



**Answer to last month's P-O-T-M.** The solution to the spider-fly problem is best seen by diagram. The problem is one in geodesics—the science that deals with "shortest distances." The trick is to consider the various ways the form of the room, a rectangular solid, could be folded

together from a flat sheet of paper. One way cuts the distance between spider and fly to 40 feet—all the more remarkable when you refold the paper and see that in so doing the spider has to cross five of the six surfaces of the room! (Right triangles show the ways distances were computed.)



# DON'T BE HALF-TRAINED...

**Be A MASTER TECHNICIAN**  
In One Of  
**AMERICA'S BIG 3 INDUSTRIES**



**FREE BOOK**

## TELEVISION RADIO-ELECTRONICS



Includes...  
**RADIO SET  
TV SET  
MULTITESTER**

Business of Your Own or High-Pay Career in...

Service & Repair  
Broadcasting & Communications  
Hi-Fi & Stereo Sound Systems  
Electronics for Guided Missiles  
TV-Radio Manufacturing

Industrial Electronics  
Automation & Computers  
Radar & Micro Waves  
TV-Radio Sales  
FCC License Preparation

## MAKE MORE MONEY

**A Successful Career... Security...  
Are Yours NOW in Modern Industry!**

RIGHT NOW IS THE BEST TIME for you to get into the field of your choice! You can be a part of its growth, you can increase your earning power, you can really build a Successful, Secure Future. Send coupon for complete facts by mail. NO SALESMAN WILL CALL!!!

N.T.S. TRAINS YOU RIGHT, FAST and EASY! Incomplete "short-cut" training limits your earning power, disqualifies you for top-pay jobs. N.T.S. Shop, Tested Home Training is..

- ★ BETTER—classroom developed, lab and shop-tested, industry-approved, home study designed.
- ★ MORE COMPLETE—you learn All Phases and you receive Everything You Need for Success...
- ★ LOWER COST—One Master Course at One Low Tuition gives you more training at lower cost.

TRAINING PAYS FOR ITSELF AND MORE... Earn your tuition—and more—while in training. We'll show you how. Many students have...so can you!

### RESIDENT TRAINING AT LOS ANGELES

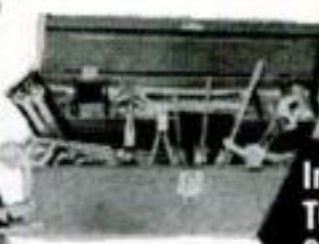
If you wish to take your training in our Resident School in Los Angeles, start NOW in our big, modern Shops and Labs. Here you work with latest equipment, finest and most complete facilities offered by any school. Expert, friendly instructors. Personal attention. Help in finding home near school... and part time job while you learn. Check box in coupon for full information.



**NATIONAL TECHNICAL SCHOOLS**  
World-Wide Training Since 1905  
4000 South Figueroa Street  
Los Angeles 37, Calif., U.S.A.

GET THE BENEFIT OF OUR OVER 50 YEARS EXPERIENCE

## AUTO MECHANICS & DIESEL



Includes...  
**TOOLS  
SOCKET SET  
ANALYZERS**

Business of Your Own or High-Pay Career in...

Service & Maintenance  
Motor Tune-Up  
Automatic Transmissions  
Diesel & Fuel Injection  
Overhauling & Rebuilding

Automobile Air Conditioning  
Electrical Systems  
Automatic Power Devices  
Industrial & Marine Engines  
Foreign Car Sales & Service

## AIR CONDITIONING REFRIGERATION ELECTRICAL APPLIANCES



Includes...  
**TOOLS  
GAUGES  
TESTER**

Business of Your Own or High-Pay Career in...

Air Conditioning—Refrigeration  
• Domestic & Commercial  
• Industrial & Mobile  
Installation & Contracting  
Automobile Air Conditioning

Electrical Appliances  
• Small & Major  
• Heating, Motor & Combination  
Sales, Service & Repair  
Manufacturing & Distribution

**CHOOSE YOUR FIELD. SELECT ONE OF THE "BIG 3" NOW. CHECK COURSE DESIRED**

## NATIONAL TECHNICAL SCHOOLS

WORLD-WIDE TRAINING SINCE 1905

National Technical Schools, Dept. C-70  
4000 S. Figueroa St., Los Angeles 37, Calif.

Please rush FREE Book and Actual Lesson checked below. No obligation. No salesman will call.

CHECK ONE

- ☐ TV-Radio-Electronics Book  
☐ Auto-Mechanics & Diesel Book  
☐ Air Conditioning, Refrigeration & Electrical Appliance Book

CHECK ONE

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

☐ Check here if interested ONLY in Resident Training at L.A.

VETERANS: Give date of discharge \_\_\_\_\_ N310P

Mail One of These  
2 Coupons TODAY  
for

**FREE  
BOOK**

and  
**ACTUAL LESSON**

Ask a Friend  
to Send the Other.  
It's Fun to  
Study Together!

**NO OBLIGATION...  
NO INCONVENIENCE...  
NO SALESMAN WILL  
CALL ON YOU!!!**

## NATIONAL TECHNICAL SCHOOLS

WORLD-WIDE TRAINING SINCE 1905

National Technical Schools, Dept. C-70  
4000 S. Figueroa St., Los Angeles 37, Calif.

Please rush FREE Book and Actual Lesson checked below. No obligation. No salesman will call.

CHECK ONE

- ☐ TV-Radio-Electronics Book  
☐ Auto-Mechanics & Diesel Book  
☐ Air Conditioning, Refrigeration & Electrical Appliance Book

CHECK ONE

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

☐ Check here if interested ONLY in Resident Training at L.A.

VETERANS: Give date of discharge \_\_\_\_\_ N310



GET READY FOR THE SPACE and SCIENCE ERA! SEE SATELLITES, MOON ROCKETS CLOSE-UP



# AMAZING SCIENCE BUYS

for FUN, STUDY or PROFIT



See the Stars, Moon, Planets Close Up!

## 3" ASTRONOMICAL REFLECTING TELESCOPE

60 to 180 Power—Famous Mt. Palomar Type! An Unusual Buy!



Assembled—Ready to use! You'll see the Rings of Saturn, the fascinating planet Mars, huge craters on the Moon, Star Clusters, Moons of Jupiter in detail. Galaxies! Equatorial mount with lock on both axes. Aluminized and over-coated 3" diameter high-speed f/10 mirror. Telescope comes equipped with a 60X eyepiece and a mounted Barlow Lens, giving you 60 to 180 power. Low-cost accessory eyepiece available for higher powers. An Optical Finder Telescope, always so essential, is also included. Sturdy, hardwood, portable tripod. FREE with Scope:

—Valuable **STAR CHART** plus 272 page **"HANDBOOK OF HEAVENS"** plus **"HOW TO USE YOUR TELESCOPE"** BOOK.  
Stock No. 85,050-N .....\$29.95 postpaid

**KNOW THE TRUTH ABOUT POWER.** Telescope experts will confirm that an Astronomical Telescope will only give you practical powers to about 50 or 60 times per inch of objective diameter—powers above this only produce empty magnification—make viewing dim, difficult and unsatisfactory.

## 4 1/4" ASTRONOMICAL TELESCOPE!

UP TO 255 POWER!



With this scope you can see everything as above but with greater power plus will split finer stars. Mirror has twice the light gathering power. Mirror guaranteed to give theoretical limit of resolution. Rack and pinion focusing, hardwood tripod, real equatorial mounting—only one adjustment follows stars! Aluminum tube. 6 power finder telescope. 2 standard size eyepieces and mounted Barlow lens give you powers of 40X, 90X, 120X, and 255X. Low-cost accessory eyepiece available for higher powers. FREE with Scope.—Valuable **STAR CHART** plus 272 page **"HANDBOOK OF HEAVENS"** plus **"HOW TO USE YOUR TELESCOPE"** BOOK. Shipping weight 25 lbs. Stock No. 85,006-N.....\$74.50 f.o.b.

Same Telescope as above but equipped with Electric Clock Drive—Stock No. 85,094-N.....\$111.50 f.o.b. Barrington, N. J.

## STEREO MICROSCOPE—TERRIFIC BUY!

23 and 40 Power!



Other American made stereos cost \$250.00 to \$600.00 and more! Now—save well over 50%. Up to 3" working distance. Erect image—wide 3-dimensional field. Helical rack and pinion focusing. So good we offer 10-DAY TRIAL... complete satisfaction or your money back. Order—Stock No. 85,056-N. Full price.....\$99.50 F.O.B. Barrington, N. J.

## NEW BINOCULAR-TO-CAMERA HOLDER

For Exciting Telephoto Pictures



Will fit any camera. Bring distant objects 7 times nearer with a 35 mm. camera. 7x50 binocular and our NEW BINOCULAR-TO-CAMERA HOLDER. Ideal for long-range shots of wild life, planes, ships, people, etc. Camera and binoculars attach easily. Use any binocular or monocular—any camera, still or movie. Take color or black and white. Full directions for taking telephotos. Stock No. 70,223-N.....\$11.50 Postpaid

## BUILD A SOLAR ENERGY FURNACE



A fascinating new field. Build your own Solar Furnace for experimentation—many practical uses. Easy! Inexpensive! Use scrapwood! We furnish instructions. This sun powered furnace will generate terrific heat—2000° to 3000°.

Fuses enamel to metal. Sets paper aflame in seconds. Use our Fresnel Lens—14" diameter... f.1. 14". Stock No. 70,130-N... Fresnel Lens...\$6.00 Postpaid



## BLACK LIGHT MAGIC-GLOW KIT

Kit uses long-wave blacklight, which is completely harmless to eyes, but causes fluorescence in over 3,000 substances. Includes Magic Glow Lamp, stand, invisible water paints and ink, fluorescent crayon, tracer powder, pen, 3 brushes, specimens of fluorescent rocks: wernerite from Canada, fluorite from England, willemite from U.S.A.

Stock No. 70,256-N .....\$10.95 Pstpd.

## BEGINNER'S LENS KITS! FUN FOR ADULTS—CHILDREN!

Kits include plainly written, illustrated booklet showing how you can build lots of optical items.

Stock No. 2-N Beginner's Kit, 10 Lenses.....\$ 1.00 pstpd.

Stock No. 5-N Gadgeteer's Delight, 45 Lenses.....\$ 5.00 pstpd.

Stock No. 10-N Experimenter's Dream, 80 Lenses.....\$10.00 pstpd.

ORDER BY STOCK NUMBER... SEND CHECK OR MONEY ORDER... SATISFACTION GUARANTEED!

**EDMUND SCIENTIFIC CO. BARRINGTON, NEW JERSEY**

## SPECIAL! SPECIAL! Terrific Buy! American Made!



## OPAQUE PROJECTOR

Projects illustrations up to 3" x 3 1/2" and enlarges them. No film or negatives needed. Projects charts, diagrams, pictures, photos, lettering in full color or black-and-white. Operates on 115 volt, A.C. current. 6-ft. extension cord and plug included. Operates on 60 watt bulb, not included. Size 12" x 8" x 4 1/2" wide. Weight 1 lb., 2 oz. Plastic case with built-in handle.

Stock No. 70,199-N.....\$7.95 postpaid

**NOTICE: EDMUND IS NOW HEADQUARTERS FOR MATH LEARNING AND TEACHING AIDS! SEE DOZENS OF OFFERINGS IN OUR FREE CATALOG—"N".**

## NEW! CIRCULAR SLIDE RULE!

Pocket Size—Fast—Easy to Use!

Be a Math Whiz! New Circular Slide Rule multiplies, divides, figures fractions, percentages, squares, cubes, roots, proportions, circumferences, areas, retail prices, fuel consumption. Eliminates the confusions of ordinary slide-rules. Directions included.



Stock No. 30,336-N .....\$4.95 postpaid

## LOW PRICED STOP WATCH

Has decimal timer so highly recommended for time study use. Seven jewels and unbreakable mainspring. Dial registers in 1/5th seconds. One revolution of long hand is 60 seconds. Small hand registers up to 30 minutes. Chromium plated case.

Stock No. 30,371-N .....\$15.95 Postpaid (tax incl.)

## Take Telephoto Shots Thru 7x50 MONOCULAR

This is fine quality, American made instrument—war surplus! Actually 1 1/2 of U. S. Govt. 7 x 50 Binocular. Used for general observation both day and night and to take fascinating telephoto shots with your camera. Brand new, \$95 value. Due to Japanese competition we close these out at a bargain price. Directions and mounting hints included.



Stock No. 50,003-N.....\$15.00 Postpaid

## ASTRO-COMPASS AND TRANSIT



War surplus! Astro Compass alone cost Govt. \$75. We have added a Sighting Level to improve versatility. Hundreds of uses in carpentry, brick laying, foundation work, grading, irrigation or drainage. Much below cost of ordinary surveying instruments. Ideal for do-it-yourselfers. 10 1/4" high, 6" long, 4" wide. Adjustable leveling platform—2 spirit levels for aligning—also spirit level in sighting attachment. A tremendous bargain.

Stock No. 70,267-N .....\$19.95 postpaid

## CLOSE OUT! MECHANICAL DRAWING SET

Regular Price \$18.00

Our Price Only \$8.00 Pstpd.

American mfr. couldn't compete with foreign imports—thus you get a terrific bargain, even far below import prices. 10 handsome pieces in velvet-lined case.

Nickel plated brass—precision American-made. We guarantee you'll be satisfied or money refunded. Stock No. 50,200-N.....\$8.00 Postpaid

## War Surplus American-Made 7x50 Binoculars

Big savings! Brand new! Crystal clear viewing—7 power. Every optical element is coated. An excellent night glass—the size recommended for satellite viewing. Individual eye focus. Exit pupil 7mm. Approx. field at 1,000 yds. is 376 ft. Carrying case included. American 7 x 50's normally cost \$195. Our war surplus price saves you real money.

Stock No. 1533-N.....only \$55.00 pstpd. (Tax included)



## FREE CATALOG-N

128 Pages! over 1000 Bargains!

Complete line of Astronomical Telescope parts and assembled Telescopes. Also huge selection of lenses, prisms, war surplus optical instruments, parts and accessories. Telescopes, microscopes, binoculars, infrared sniperscopes, science experiment items, math learning and teaching aids.

REQUEST CATALOG-N

EASY PAYMENT PLAN AVAILABLE! DETAILS WITH CATALOG!





# The month in science

**Liquid machines.** Three Army scientists have invented a remarkable new way to put fluids to work. It suggests, among other things:

- ▶ Automobiles that, from engines to wheels, employ nothing but fluid-filled pipes—no moving parts at all.
- ▶ Phonographs that operate by compressed air, without vacuum tubes, transistors, or anything electrical.

The new system, called pure fluid controls, was invented by B. M. Horton, R. E. Bowles, and R. W. Warren of the Diamond Ordnance Fuze Laboratory. Their strange devices can do what is now done by gears, valves, and vacuum tubes, yet they consist

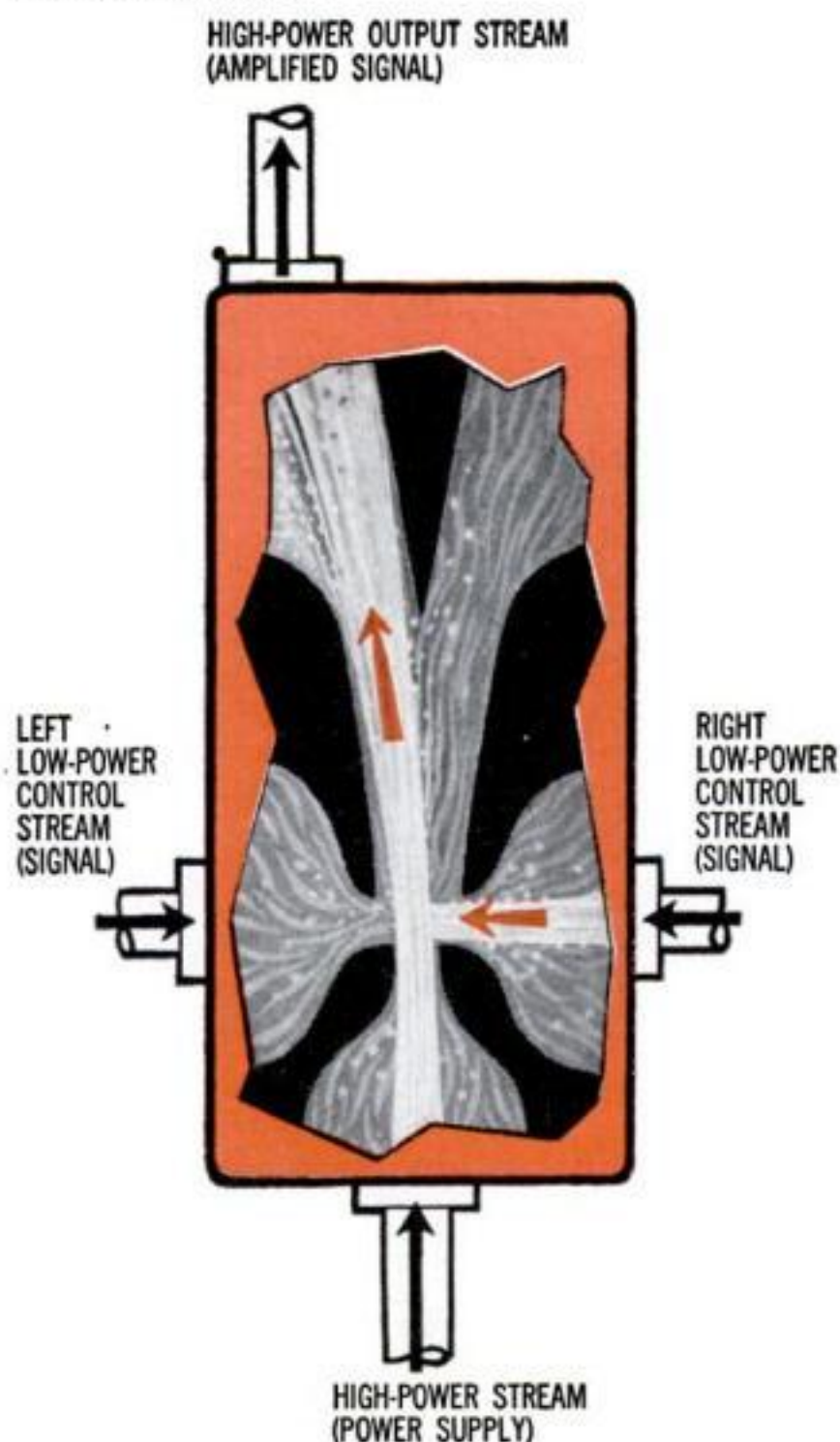
only of weirdly shaped conduits for streams of liquid or gas. Nothing moves except the fluid, and there is no electricity. You could use them as amplifiers for phonographs, for instance, or switches, or even memories for automatic computers.

Fluid controls are old and widely used (just in automobiles there are torque converters, windshield-wiper mechanisms, and the gadgets that operate power options such as brakes, steering, and window lifts). But these have always combined fluids with mechanical elements—pistons or valves. And the mechanical parts are heavy, they wear out or break—and worse, they are slow. The new idea is to replace the mechanical elements with extra streams of fluid. One stream of fluid controls a second stream of fluid. It's much like a vacuum tube, in which one stream of electricity (the signal) controls a second stream of electricity (the output).

Basic element in this new system is the pure fluid amplifier. Like an electronic amplifier, it makes big ones out of little ones by shaping a powerful output to duplicate

a weak input. The output and input are streams of liquid or gas. The amplifier is a metal block containing channels connected to the fluid-carrying pipes (see diagram). The weak "control stream" (input) pushes sideways against the strong "power stream" (output), moving it so that more or less gets to the output channel. Adding a few extra channels to the fluid

## How streams of fluid make an amplifier





## The month in science continued

amplifier makes it a "flip-flop," a special kind of switch used in automatic computers.

The Army is excited about the fluid system (for automatic controls for guns, tanks, planes) because:

- ▶ It is foolproof—no moving parts, no electricity, just plumbing.
- ▶ It should work under any conditions of heat or cold.
- ▶ It can't wear out.
- ▶ It should be cheap to make.
- ▶ It operates much faster than mechanical systems (fast enough to handle audio frequencies), but slower than electrical systems.

Pure fluid controls look like a natural for such things as windshield wipers and seat shifters. The fluid amplifier might also make a radical new kind of automatic transmission. Present transmissions are torque converters—they trade speed for push without changing the energy delivered to the wheels. The amplifier could vary the energy transmitted from engine to wheels. That might lead to a complete hydraulic drive: the engine pumping fluid to individual turbines at each wheel.

**Fiber-glass igloos.** It had to happen. They're trying to make better ice. Not for skating or Scotch-on-the-rocks, but for airplane runways, buildings, missile pads, and even floating islands. Ice and snow cover 10 percent of the earth, a 10 percent that is interesting, strategically important, and a very long haul from building-supply dealers.



Reinforced ice holds a typewriter.

The trouble with ice—the way nature made it—is that it isn't strong enough. Runways of ordinary ice have to be four to six feet thick. So Prof. W. David Kingery of MIT is working on ice alloys (oddly enough, he's an expert on *high*-temperature ceramics). First result of his research is fiber-glass-reinforced ice. Mixing in four percent of the glass fibers makes ice 10 times stronger, as the photo at left demonstrates. Another alloying material is sawdust, which triples the strength of ice. The British developed that idea during World War II; they envisioned (but never built) a huge floating

airfield (2,000,000 tons) to be scooted close to the enemy shore.

One problem still troubling Professor Kingery: The ice melts.

**What you can do with old uranium.** Ever think of making burned-out uranium into insect repellent? That's one of several dozen non-nuclear uses for depleted uranium that have been suggested by the AEC, which worries about getting stuck with 10,000 to 20,000 tons of the stuff a year. Among the other applications: dyes and pigments, medicine, gold-hardening alloy, counterweights for airplane flaps (uranium is heavier than lead). The going price for uranium—after it has fissioned—is \$2.27 a pound.



# Bean's Chamois Cloth Shirt



Looks and feels like high grade chamois leather. Will not shrink. More durable than wool. Mr. Bean personally uses this shirt on his fishing and hunting trips. Colors: Tan and Bright Red. Sizes: 14½ to 19. Price: \$5.85 Postpaid. Send for free sample and Free Catalog.

L. L. Bean, Inc., 319 Main Street, Freeport, Maine  
Mfrs. Fishing and Camping Specialties

IT'S EASY TO ROLL OUT THIN LINES with

## Master PAINT STRIPER

You can do professional striping on furniture, boats, autos, bikes, plywood, etc. Master Striper rolls out uniform lines on wood, glass, plastic, ceramics, almost any surface with paint, temperas, glue, textile-paint or underglaze; also used in industry.



MAKES  
CLEAN,  
STRAIGHT OR  
CURVED LINES;  
VARIOUS WIDTHS  
AVAILABLE.

TYPE M Tool with 1/16" roller tip... \$1.50  
Other size Tools (1/64", 1/32", 3/64", 5/64", 3/32", 1/8")..... 2.00  
Extra Roller Tips, Sizes above, ea..... 1.00  
Extra Roller Tips, 1/4" ea..... 1.25  
Special complete set with 7 tips, only 5.50  
DOUBLE STRIPE KIT—5 combinations 3.50  
(COD's. Postage Collect)

WENDELL MFG. CO., 4234 LINCOLN AVE. DEPT. 37  
CHICAGO 18, ILL.

# FREE

## EICO®

### CATALOG

Build Your Own  
Hi-Fi, Radios,

Ham Gear, Test Inst., — Save 50%

Get started in ELECTRONICS the easy EICO way. No technical knowledge needed to build EICO kits. Simple, step-by-step "Beginner-Tested" pictorial instructions guide you all the way. LIFETIME service & calibration guarantee. Mail coupon now!



EICO, 33-00 Northern Blvd., L. I. C. 1, N.Y.  
Please send FREE catalog & name of local dealer. PS-7

Name .....

Address .....

City ..... Zone ..... State .....

prepare for your career in

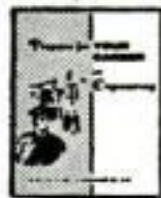
# ELECTRONICS ELECTRICAL ENGINEERING RADIO-TV COMPUTERS

At MSOE, you can equip yourself for a career in many exciting, growing fields:  
MISSILES • RADAR • AVIONICS  
AUTOMATION • RESEARCH  
DEVELOPMENT • ELECTRICAL  
POWER • ROCKETRY

When you graduate from the Milwaukee School of Engineering, you are prepared for a dynamic career as an Electrical Engineer or Engineering Technician. Under a faculty of specialists, you gain a sound technical education in modern, completely equipped laboratories and classrooms. As a result, MSOE graduates are in great demand and highly accepted by industries nationally.

At MSOE, you will meet men from all walks of life and all parts of the country — some fresh out of high school or prep school others in their twenties — veterans and non-veterans.

You can start school in any one of four quarters and begin specializing immediately. Engineering technicians graduate in 2 years with an Associate in Applied Science degree. For a Bachelor of Science degree in Engineering, you attend 4 years. A 3-month preparatory course also is available.



### FREE CAREER BOOKLET!

If you're interested in any phase of electronics, radio or television, be sure to look into the programs of study offered by the Milwaukee School of Engineering. Just mail the coupon.

## MILWAUKEE SCHOOL OF ENGINEERING

Dept. PS-760 1025 N. Milwaukee St.  
Milwaukee, Wisconsin

Please send FREE Career Booklet. I'm interested in  
☐ Electronics ☐ Electrical Power ☐ Television  
☐ Mechanical Engineering ☐ Radio ☐ Computers  
☐ Electrical Engineering ☐ Industrial Electronics

PLEASE PRINT

Name ..... Age .....

Address .....

City ..... Zone ..... State .....

☐ I'm eligible for veterans education benefits

MS-125



# DRAFTSMEN



**CASH BIG  
PAY CHECKS!**

Train Now for  
more success,  
greater security

**LEARN AT HOME IN SPARE TIME**  
(or at college in Chicago)

Check the want ads in any newspaper—SEE the big-pay opportunities open to you as a draftsman. What's more, you can learn this well-paid, prestige profession at home—quickly, easily! No special talent needed! Get complete, step-by-step Chicago Tech lessons in the mail, spend a few pleasant hours studying each week. In a short time you'll be a well-trained draftsman, ready to take your pick of many good jobs. Act now!



**FREE INFORMATION—MAIL COUPON TODAY!**  
Get **FREE TRIAL LESSON** plus information about C.T.C. practical training. Learn what successful Chicago Tech graduates say about high pay and opportunities in drafting. No charge, or obligation.

## CHICAGO TECHNICAL COLLEGE

H-230 Tech Bldg., 2000 So. Michigan Ave.  
Chicago 16, Illinois  
Mail me **FREE Lesson** with information about big opportunities in **DRAFTING**.

Name ..... Age.....  
Address .....  
City ..... Zone..... State.....

*Great for  
outdoor gluing  
on sea  
and land!*

Elmer's Waterproof Glue. Forms a bond **stronger than the wood itself!** The glue of glues for boats, furniture, sports equipment, window boxes—and every other outdoor job. Send stamped, self-addressed envelope for **free** copy of "Elmer's Guide To Good Gluing". Borden Company, Dept. PS70, 350 Madison Ave., N.Y. 17, N.Y.



# MAGIC MAIL PLAN

*that comes with this Little Machine*  
**CAN MAKE YOU \$5.00 AN HOUR**

The machine is turning out a job that will bring operator \$2.58, by mail. Material cost, only 11c!



Write today for free facts about the newest and most fascinating of all new home operated businesses. For the first time, a simplified machine brings the fabulous profits of Plastic Sealing and Plastic Laminating within reach of the small operator. Anyone can learn to operate it with a few minutes practice. Then—with our **MAGIC MAIL PLAN**—can get mail orders pouring in daily with cash in every envelope.

**No Canvassing or Selling**

Fill orders at home in spare time to start. Then expand to full time business. We even supply circulars to bring back cash and orders. Rush name for all the facts you need to start. A postcard will do. No charge.

**WARNER ELECTRIC CO., Dept. L-3-H**  
1512 Jarvis, Chicago 26, Illinois

"No Matter what YOUR AGE, 15, 20, 30, 40, 50

if you **ACT AT ONCE** my \$500  
**HE-MAN Picture-Packed Courses** **FREE**

HOW to GAIN or LOSE up to 50 lbs. while

**YOU Become a NEW STREAMLINED**  
**ALL-MALE HE-MAN** quickly, easily

says **JOWETT** **GREATEST BUILDER**  
of **SUPER HE-MEN**

I'll let you know HOW to get  
\$80 of apparatus, etc., **FREE**

Send a dime for mailing. State your age to

**JOWETT INST. (Dept. PS-07) 220 Fifth Ave., New York 1, N. Y.**



Make up to  
**\$300**  
or more

Over 300 New Items For Quick  
**EXTRA MONEY**  
Now To Christmas

**IN  
SPARE  
TIME**

Just Show **Fabulous New 1960 Evans Line**  
No-Money-Down, No-Risk Starting  
Sample Plan. You keep up to \$1.00  
per item. Self-selling **EVANS**  
Line, huge plant mean more sales,  
faster service. Send today for  
salable boxes to be paid for or  
returned—plus big **Free Album** of  
Personalized cards, 2 big Order-  
Getting Illustrated Catalogs of  
over 300 items. Write now.

**NEW ENGLAND ART PUBLISHERS, North Abington 739, Mass.**

**300 POWER.....**



**Complete Telescope Lens Kit** only **\$3.98** postpaid

Conquer Space, Explore the Universe. Planets, Moon craters, New Stars, etc. Complete Lens Kit consists of 80 inch focal length ground and polished objective lens, eyepiece lenses for 50 POWER, 100 POWER, 150 POWER, 200 POWER, 250 POWER, 300 POWER, and all necessary lens fittings. Easy to make from simple step by step instructions. (Tripod and mount not included.) Money back guarantee.

**BUSSE SALES CO., Hartford, Conn., Dept. PS-88**

## FIBERGLASS or PLYWOOD

**\$41.95 Up: EASY TERMS**

**Write Now**

**FREE CATALOG**

**50 Models 8-22 ft.**

Cruisers, houseboats, runabouts, convertibles, fishing, sailing. Pre-assembled, pre-formed units anyone easily assembles. Equal factory-built. Save 1/2 to 2/3. Free catalog has all details, color photos, paint, accessories, Fiberglass supplies, trailers. **WRITE TODAY.**

**LUGER BOAT KITS**

Dep't A-7, 9200 Access Road, Minneapolis 20, Minn.





LEARN TO EARN

## HIGH WAGES

AS A HEAVY EQUIPMENT OPERATOR!



Secure a high paying future in the exciting construction industry today! Learn to operate bulldozers, draglines, cranes, back hoes, scrapers and motor graders on our actual construction projects!

- ONLY CONTRACTOR OWNED AND OPERATED SCHOOL IN WORLD
- ASSOCIATE MEMBER ASSOCIATED GENERAL CONTRACTORS
- MODERN EQUIPMENT
- V. A. APPROVED FOR G. I. TRAINING
- BUDGET PAY PLAN AVAILABLE

### WESTERN NATIONAL

SCHOOL OF HEAVY EQUIPMENT OPERATION

WRITE TODAY FOR FREE SCHOOL CATALOG

Dept. F-6 Box 510  
Weiser, Idaho Phone 910



## 8FT. SPECIALS — 80¢



They're really BIG! These GIANT 8 FOOTERS (new, genuine neoprene govt. surplus) are terrific.

### \*FUN

for young & old alike

- Parties
- Schoolproms
- Picnics
- Beach, etc.

Yours at a fraction of their original cost. Order several, they make wonderful gifts.

### \*BUSINESS

Just paint a message on, inflate & fly

- Store Openings
- Gas Stations
- Fairs
- Trade Shows, Etc

8' dia.—80¢ ea. 2 for \$1.50  
13' dia.—\$1.95 ea.—15' dia.—\$2.95 ea.  
20' dia.—\$4.95 ea.—25' dia.—\$5.95 ea.

Postage pd. on ppd. orders.  
Cal. res. add sales tax.

FRANK SALES, DEPT. PS760, 3828 Sunset Blvd., Los Angeles 26, Calif.

## • Finish HIGH SCHOOL at Home •

- in spare time. Progress at your own speed.
- Many finish in 2 years. Equivalent to resident school—prepare for college entrance exams. Standard H.S. texts furnished.
- Credit for subjects already completed. Single subjects if desired. Diploma awarded.

Write today for Free Bulletin!

AMERICAN SCHOOL, Dept. HB46, Drexel at 58th, Chicago 37



## BE A SERVICEMAN — Fix Appliances

Tremendous jump in electrical appliances and devices has increased need for servicemen. Good money-making opportunities for young and older men. Benefit soon these five ways: (1) fix appliances after hours, weekends; (2) have full time service shop; (3) fill job openings being advertised; (4) go into sales and service business; (5) save, fix own appliances. Modern training program. Beginners learn in spare time at home. Professional Tester Kit furnished. Low cost, monthly terms. Information free. Mail coupon.

NATIONAL RADIO INSTITUTE  
WASHINGTON 16, D.C.

BGO

Name.....

Address.....

City.....Zone.....State.....

# RCA WILL TRAIN YOU

## FOR A LIFETIME CAREER IN General Electronics TV Servicing Automation Color TV

SEND FOR  
THIS **FREE**  
64-PAGE  
"CAREER"  
BOOK  
TODAY!



Countless opportunities are open in the rapidly expanding world of electronics. RCA Institutes offers you the finest of training at home in your leisure hours. Pay only as you learn. No previous technical training required. Courses for beginners and advanced students.



## RCA INSTITUTES

A Service of Radio Corporation of America

In Canada: RCA Victor Company, Ltd.

5575 Royalmount Ave., Montreal 9, Que.

RCA Institutes, Inc., Home Study School Dept. PS-70  
350 West Fourth Street, New York 14, N. Y.

Please rush me your FREE illustrated 64-page book "Your Career in Electronics," describing your home training programs. No obligation. No salesman will call.

Name..... Age....  
(please print)

Address .....

City.....Zone.....State.....

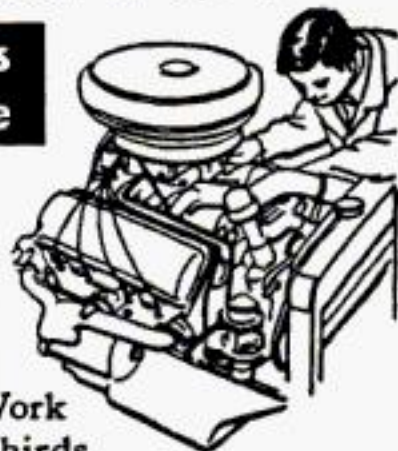
Korean Vets: Enter discharge date.....

Resident Schools in New York City and Los Angeles.  
Catalog on request.

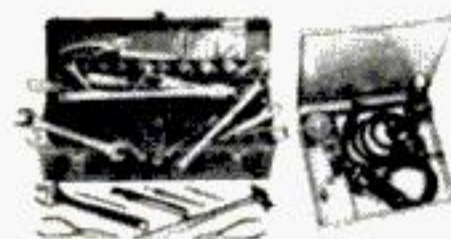


# START at the TOP

## Learn Auto Mechanics at Home in Spare Time



"America is short 100,000 auto mechanics," a famous magazine reports. "America needs 25,000 more auto repair shops," a noted motor executive says. Pay is tops. Work is steady everywhere. Two-thirds of all cars are in heavy-repair class! Mail coupon for free new catalog and sample lesson.



### Tools & Tune-Up Kit Sent

CTI sends you professional Mechanic's Tools and valuable instruments, including a Compression Tester, Vacuum Gauge & Fuel Pump Tester, Ignition Timing Light; and a handy portable steel case.

MANY STUDENTS EARN CASH as they train. They fix cars on their own, or work in local shops. All facts free. Mail coupon now for Catalog and Sample Lessons.

COMMERCIAL TRADES INSTITUTE Dept. A1298  
1400 Greenleaf Avenue • Chicago 26, Illinois  
Send booklet, Make Big Money in Auto Mechanics

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Accredited by National Home Study Council

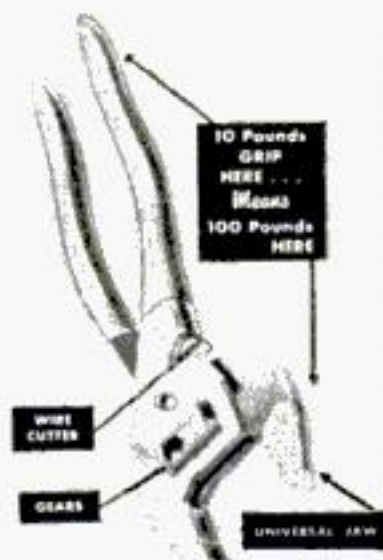


## A COMPLETE WORKSHOP IN ONE TOOL!

### Geared PLIERENCH

10 to 1 Gear Ratio—  
1 Ton Gripping Power

- It's a Geared Ratchet Wrench—The powerful gripping strength of the Universal jaw securely holds corners, edges as well as flat surfaces.
- It's a Pipe Wrench—Replaces pipe, monkey and adjustable wrenches that securely grip up to 2" O.D. with 5000 lbs. of gripping power.
- It's a Wire Cutter—Snips off the heaviest barbed wire—even a 16 penny spike.
- It's an Internal-External Wrench & Pipe Extractor—Grips tubes and pipes from the inside where no outside area is exposed. Expando jaw can act as a jack lifting objects up to 600 lbs.



Guaranteed 5 Years

A fantastic tool for homeowners, farmers, mechanics. Replaces a multitude of ordinary tools, including complete sets of wrenches. Eliminates need for all types of pliers. Cuts heavy wire. Automatically locks as vise or clamp. Made of select hand-forged tool steel. Hi-Drive heat treated. 100% parallel jaws give the Plierench 5000 lbs. of gripping power. The special gear transmission allows instant adjustment to any size or shape. The Plierench is UNCONDITIONALLY GUARANTEED for 5 years. Comes in handy tool pouch.

PLIERENCH WITH UNIVERSAL JAW.....\$6.98  
plus 35¢ pp. & hldg.

Plierench Standard Kit with Universal Jaw PLUS Giant Pipe Jaw, Giant Internal-External Jaw, Wire Jaw.....\$9.98  
plus 35¢ pp. & hldg.

Plierench Master Kit—Same as Standard Kit PLUS Pipe Jaw and Tube Cutter Set.....\$13.45  
plus 35¢ pp. & hldg.

MONEY BACK GUARANTEE—Send Check or M.O.—C.O.D. Plus Fee

SCOTT-MITCHELL HOUSE, INC.

Dept. HC36, 415 S. Broadway, Yonkers, New York

## PRINT YOUR OWN MONEY!



Not really, of course. Uncle Sam doesn't approve. We'll send you an amazing new printing invention (weighs less than 10 lbs.!) that makes money so fast one user says, it's almost like printing \$20 bills! Actually lets you turn out—on a small table in garage or corner of a bedroom—many printing jobs that are impossible on even a huge \$5000.00 press.

**PRINT WITHOUT A PRINTING PRESS.** Yes, with equipment so simple we supply it FREE with Instructions, you can actually under-sell the biggest, most elaborate printing establishments on many types of printing—for theatres, gas stations, markets, stores, offices, etc., and just about every business within 100 miles around. Screen-Print works on glass, metal, plastic, cloth, leather—anything at all—on curved surfaces as well as flat. **YOU, TOO CAN MAKE BIG MONEY AT HOME.** Cash in on this sensational new home-business development. No experience needed! Learn in a few hours! Some don't earn money, but some use spare time to earn up to \$15 an hour—\$100 or more a week. **WE SUPPLY EVERYTHING YOU NEED.** Complete instructions, Screen Print equipment, enough supplies to start you making money almost immediately, can now be yours for only pennies a day! We guide and help you, supply step-by-step directions for building a profitable home business fast. Send for FREE details, samples and exciting Home Business plan. No obligation.

Write TODAY SURE.

SCREEN PRINT CO. Dept. 17, 15127 S. BROADWAY, LOS ANGELES 6, CALIF.

## NO MONEY DOWN!

**Florida** HOME SITES  
\$395

Lovely 1/4 acre sites in Central Florida hills, lake, grove area \$395, no money down, \$10 a month • Suburb of Ocala, high and dry • Streets, utilities • 22 miles to Gulf Beaches • Fish, hunt • Invest or retire. FREE color folder • Write Dept. 619-L, Rainbow Park, Box 521, Ocala, Fla. AD 59067

## NO JOB WORRIES

PLASTEX INDUSTRY needs manufacturers on small scale for big production of Lamps, Clock Stands, Art Goods, Novelties in Plastic Marble imitation. No Experience necessary. Use material makes regular 10¢ store sellers. Moulds furnished for fast production. Small investment brings good profit. Big wholesale orders now being placed. Ambitious men have chance for real prosperity and job security. Our NEW FREE booklet will interest and benefit you.

PLASTEX INDUSTRIES, Dept. 2, 3400 Third Ave., New York 56, N. Y.

## OWN a BUSINESS!



### We'll Train and Establish You

Start part-time if employed. You'll be trained by a nearby dealer and at 5-day training school. As carpet-upholstery cleaning expert, you provide 6 services to multiply profits and customer satisfaction. No shop needed. Just 2 average jobs a day nets \$8,750 first year. We help build your business with 27 continuous services: counseling, nat'l advertising (McCalls, Parents, House Beautiful, others), newspaper ads mats, etc. Send for FREE booklets.

DURACLEAN CO., 0-187 Duraclean Bldg., DEERFIELD, ILLINOIS



## Everything You Need for UNDERWATER

Sports and Adventure

### DIVEMASTER

### SKIN AND LUNG DIVING EQUIPMENT

Leading nationally known and foreign made products. Inspection tested at money saving prices. Underwater Breathing Apparatus, Swimming Masks and Fins, Diving Masks, Spear Guns, Water Skis, Diving Suits, etc. Send 50¢ for big illustrated Catalog.

(Dealer Inquiries Invited)

DIVEMASTER

Dept. PS-70

5637 W. 63rd Place Chicago 38, Ill.





## Make Money with MULTICRETE

Get into the garden masonry business — where manufacturing is easy, where the market is broad, and where income potentials are highly attractive.

Multicrete is a line of concrete masonry for building many things around house and garden — patios, walks, terraces, steps, barbecue pits, lattice walls, piers, planters, and many more. There's a place for Multicrete around almost every home.

The new Multicrete machine is compact and self-contained. Easy to operate because of hydraulic movements and automatic controls. Requires very little space. High production with low labor costs. Requires only moderate investment, with time-payments where desired. Write for free literature.

W. E. DUNN MFG. CO.  
402 W. 24th Street  
HOLLAND, MICH.



M-2

Patio Stones  
Screen Block  
Brick, etc.



## Pocket Transistor Radio

Mighty Midget  
\$5.95



Low Price! Smart Design! Size of cigarette package, yet thrilling performance. Weighs only 3 ounces. Listen to music, sports, news, variety programs on your personal portable. Modern ivory & blue plastic case, gold metal grille. Complete broadcast band. On-off switch one end. Uses standard penlight cells (included). Guaranteed. Complete, ready for immediate playing. Postpaid Only... \$5.95



JOHNSON SMITH & CO.

Dept. 908

Detroit 7, Michigan

## ENGINEERING SCIENCE MATH

DEGREE IN  
27 or 36 MOS.



ACCELERATED YEAR-ROUND PROGRAM prepares for early employment in fields of SCIENCE AND ENGINEERING. Regular 4-year program for B.S. Degree completed in 36 months, special engineering degree program in 27. Classes start quarterly—September, December, March, June. QUALITY EDUCATION. Graduates employed from coast to coast. Government approved for veteran training. Students from 50 states, 40 countries, 20 buildings; dorms, gym, Campus. SAVE TIME AND MONEY. EARN BOARD while studying. Write for catalog and complete information.

## INDIANA TECHNICAL COLLEGE

670 E. Washington Boulevard, Fort Wayne 2, Indiana

Please send me free information on Bachelor's Degree Programs in Engineering and Science as checked below:

- |   |  |
|---|--|
| <input type="checkbox"/> Aeronautical Engineering | <input type="checkbox"/> Mechanical Engineering    |
| <input type="checkbox"/> Chemical Engineering     | <input type="checkbox"/> Metallurgical Engineering |
| <input type="checkbox"/> Civil Engineering        | <input type="checkbox"/> Physics                   |
| <input type="checkbox"/> Electrical Engineering   | <input type="checkbox"/> Chemistry                 |
| <input type="checkbox"/> Electronic Engineering   | <input type="checkbox"/> Mathematics               |

Name \_\_\_\_\_

Address \_\_\_\_\_

# DON'T LET THIS GAUGE FOOL YOU



PLAY SAFE  
WITH THIS  
*Dual-Action*  
MOTOR OIL

The temperature gauge on your car shows water temperature only. Even when it registers normal on short city trips, your engine is running cold. Resulting cold sludge deposits cause corrosion, costly wear. Conversely, high-speed highway driving means power-robbing varnish deposits. Kendall Dual Action Motor Oil keeps both hot and cold running engines cleaner, quieter, livelier.

Ask your favorite  
dealer for it!

KENDALL REFINING CO.  
BRADFORD, PENNA.



# ABSOLUTELY FREE!



**IN JUST  
15 MINUTES  
I'LL PROVE  
I CAN GIVE  
YOU A VIRILE,  
RUGGED.**

## HE-MAN BODY!

In just 15 minutes, right in the privacy of your own room, through my **TRIPLE-PROGRESSIVE COURSE**, I'll slap pounds of steel-like muscles all over your body. I'll add 4 inches of power-packed muscles to your chest — another 3 inches of steel-packed muscles to your arms — I'll give you lifeguard shoulders and speedy, athletic legs. I'll also build inner strength and give you that virile look that men envy and women admire. LET ME PROVE AT MY OWN EXPENSE THAT EVERYTHING I SAY CAN BE DONE!

Send me this coupon and I will rush you my **GIANT 48-PAGE COURSE** that teaches you privately how you can become a real HE-MAN. **DON'T MISS THIS ONCE-IN-A-LIFETIME OPPORTUNITY.**

**JOE WEIDER** Dept. 100-70W  
"Trainer of the Champions"  
803 Palisade Avenue  
Union City, New Jersey

Dear Joe:

Rush me my **FREE POWER-PACKED MUSCLE COURSE**. I am under no obligation, and I enclose 10¢ to cover handling and postage charges.

Name .....

Address .....

City.....State.....Age.....

In Canada: Write Joe Weider, 2875 Bates Road, Montreal, Que.

**AMAZING  
FREE TRIAL  
OFFER**

## engineering degree in only 27 months

Realize your dream of becoming a graduate engineer. Then promotion will not pass you by. Share rewards awaiting college men . . . higher income . . . rapid advancement. Important firms visit Tri-State campus to interview seniors. Founded 1884. **Bachelor of Science Degree in 27 months** in Electrical Engineering (Electronics or Power major), Mechanical, Civil, Aeronautical, Chemical Engineering. **In 36 Months** a B.S. in Business Administration (General Business, Accounting, Motor Transport Management majors). For earnest, capable students. Small classes. More professional class hours. Well-equipped, new and modernized buildings, labs, dorms. Modest costs. Year-round operation. Enter Sept., Jan., Mar., July. Write

**J. F. McCarthy**, Director of Admissions, for Catalog and Career Book.



# TRI-STATE COLLEGE

570 College Avenue • Angola, Indiana



**New .22  
Revolver &  
Quick Draw  
SHOULDER  
HOLSTER . . . \$12.95**

**GUN &  
HOLSTER  
\$12.95**

**BIGGEST BARGAIN OF ALL TIME!** A precision made 6-shot .22 Cal. target revolver (W. German made), and a top quality black leather shoulder holster (Detective type), for only \$12.95! Revolver has steel rifled barrel, blade front sight, side gate loading feature, and fires popular .22 short and long ammo available at all gun stores. Holster is made of finest American leathers, well stitched, and has catch device to hold pistol firmly until drawn. Send check or M.O. Shipped F.O.B. San Diego express charges collect. \$7.50 deposit for C.O.D. Holster alone, \$2.95. Calif. resid. order thru local dealer. Purchasers must be 18 years. **SATISFACTION GUARANTEED!**

**VIKING ARMS CORP., 924 Fifth Ave., San Diego 10, Calif.**



## BARBELLS

**100  
POUND  
SET  
\$12.80**

Extra  
Plates Only  
12c Pound

**140-Pound, CHROME DELUXE Barbell-Dumbbell set only \$19.80.** This is our feature set and is the finest ever manufactured. Training with adjustable weight is the **BEST** way to keep fit; the **ONLY** way to develop great strength and a perfect body. As the oldest and best equipped barbell company, BUR gives value and prices no one can equal.

**SEND FOR FREE CATALOG.  
BUR BARBELL CO.  
Lyndhurst 5, New Jersey**

## Draw CARTOONS



...for a wonderful pastime or excellent earnings. Master cartooning at home in a few short weeks without waste of time or effort through the **Famous System of Manual Training**. Send for Big, Illustrated **FREE Catalog!**

**CONTINENTAL SCHOOLS, INC., Dept. B-7  
4201 South Broadway, Los Angeles 37, California**



**"I'M MAKING \$1000 a Month  
MORE THAN**

**Haven't Touched Bottom Yet!"**

—reports Charles Kama, Texas, one of many who are "cleaning up" with orders for **PRESTO**. Science's New **Miracle Fire Extinguisher**. So can YOU! Amazing tiny new extinguisher ends fires fast as 2 seconds. Guaranteed 20 years! Sells for only \$4.95. Write for **FREE Sales Kit**. No obligation. **MERLITE INDUSTRIES, INC., Dept. P-16R  
PRESTO DIV., 114 E. 32nd Street, New York 16, New York**



## "YOU ARE UNDER ARREST!"



**Help Bring Crooks to Justice Through Scientific  
CRIME DETECTION!**

We have taught thousands this exciting, profitable, pleasant profession. Let us teach you **in your own home**. Learn **Finger Printing, Firearms Identification, Police Photography, Secret Service Methods** thoroughly, quickly, at small cost. Over 800 of all American Bureaus of Identification employ I.A.S. students or graduates. Write for **FREE "Blue Book of Crime."**

(A Correspondence School Since 1916)  
**INSTITUTE OF APPLIED SCIENCE, 1920 Sunnyside Ave., Dept. 1368, Chicago 40, Ill**

## THE ORIGINAL PACKAGED BOAT KITS

• World's Largest Line—New Fiberglass Hulls. Over 200 styles Boats-Kits, Formed-Hulls, Semi & Custom finished. All types: Pkms, Cruisers, Racers, Inboards, Outboards. Easy to build. Professional results. Dealers - Agents Inquire. **Send 15¢ for 3-Colored Catalogs** 52 pg. Kit Catalog plus 20 pg. Hardware and 8 pg. Armor Glass books. **(SPECIAL OFFER!)** All 3-colored CATALOGS plus "Boating Handbook" . . . all for \$1.

MADE ONLY BY *Custom-Craft*



**★ BOAT  
PLANS, PATTERNS  
FRAME PACS**

• Over 400 Plans-Patterns, Frame Pak Kits. Pkms, Kayaks, Racers, Runabouts, Catamarans, Cruisers-In-Outboards (6' to 40') Wood, Plywood and Steel. **Send 35¢ for 120 pg. Plan Catalog.** Catalog plus "Boat Building Handbook" . . . Send \$1.00.

**CUSTOM • CRAFT Buffalo 7, N. Y.**



# CASH IN ON **BIG PROFITS** in **HOME PACKAGING** WITHOUT SELLING!

**HERE'S PROOF**  
that Packaging means  
Big Profits for You!

Item Per Doz.	Bulk Cost	Sells For
Safety Pins	2 1/2¢	15¢
Balloons	3 1/2¢	19¢
Fish Hooks	2¢	50¢

Make profits like these on over 100,000 other products you can package right in your own home. We show you how!

Package bulk products. Help fill huge demand. Make profits up to 2500%! New Plan guides you step-by-step to big money in self-service packaging, contract packaging, gift wrapping. No selling — our nationwide sales force sells for you. Full or spare time. No experience needed. Everything furnished. Write today for FREE PLAN, details. No salesman will call.

HOME PACKAGING CO., Dept. C247  
2212 E. Jesse St., Los Angeles 23, Calif.



## MANUFACTURE this BEAUTIFUL OUTDOOR FIREPLACE in YOUR OWN BACKYARD

\$4.00 worth of sand and cement produces this attractive fireplace. Sells on sight from \$60 to \$80. Easy to start your own profitable business in your backyard. No experience necessary. Big profits. Exclusive manufacturing territories. Write immediately for full details. General machines sold to U.S. Government. Dealer inquiries invited.

GENERAL ENGINES CO., INC. Dept. SF-70 Rt. 130  
Thorofare, N. J.



## ACCORDIONS UP TO 1/2 OFF

Save up to 1/2 off retail prices of comparable accordions

**5-DAY FREE TRIAL**  
Buy DIRECT from world's Largest Exclusive Dealer! Compare our Importer-to-You prices! See how you save! Over 80 models—finest genuine Italian makes! New, easier terms! 5-Day Free Home Playing Trial with satisfaction 100% assured. Bonus Gifts Free. Rush name and address for FREE Color Catalogs and direct Importer-to-You prices—FREE. Write TODAY!  
Accordions Corporation of America  
2003 W. Chicago Av., Dept. P-70, Chicago 22

## WATCH REPAIRING

Learn to repair Swiss and American watches. It's fascinating, profitable. Unique Sweazey System shows you how step by step. Shop method home training. Low terms. Diploma awarded.

**FREE  
SAMPLE  
LESSON**

CHICAGO SCHOOL OF WATCHMAKING

2330 N. Milwaukee, Dept. 470, Chicago 47, Ill.

# ELECTRONICS

Train in the new shop-labs of the world famous  
**COYNE ELECTRICAL SCHOOL** on a quarter of a million dollars worth of equipment or learn at home in your spare time with Coyne's modern television training.

Use this coupon to get our free book  
"GUIDE TO CAREERS"

COYNE ELECTRICAL SCHOOL  
1501 W. Congress Pkwy.  
Chicago 7, Ill., Dept. of Electronics III

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

☐ training  
at Coyne

☐ training  
at home

Unlike most other schools, we do not employ salesmen.

# It's Like Having Factory Experts Right Beside You...



## SHOWING YOU HOW TO FIX ANY PART OF ANY CAR

Now — Whether You're a Beginner  
or an Expert Mechanic — You Can  
"Breeze Through" Any Repair Job—  
QUICKLY — EASILY — RIGHT!

THERE'S ONE SURE WAY to "lick" any auto repair job — that's to get the advice of a real auto expert. MOTOR'S Auto Repair Manual brings you this expert guidance from the engineers who make the cars and know them "inside out." Yes, you get the "know-how" from 176 OFFICIAL SHOP MANUALS — boiled down into one giant volume!

No guesswork! MOTOR's Manual "starts from scratch" — leads you through entire job with easy step-by-step directions, clear "how-to" pictures. You CAN'T go wrong!

**1,000 BIG PAGES—2,850 PICTURES**

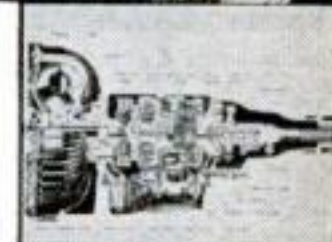
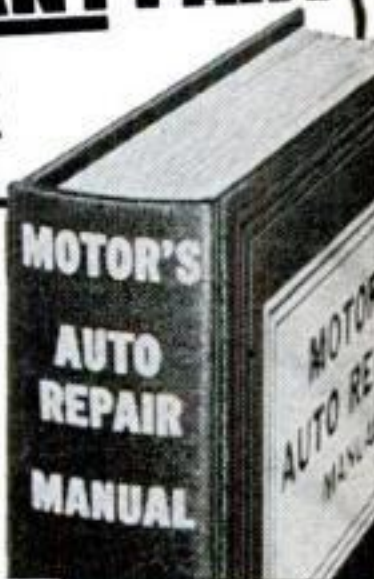
Brand-new edition covers all popular American car models 1953 thru 1960 — from simple tune-ups to stripping rear-ends! Over 1,000 Giant Pages. 2,850 This-is-How Pictures. 195 Quick-Check Charts. 30,000 essential repair specifications. Over 225,000 service and repair facts PLUS Giant TROUBLE-SHOOTING SECTION that spots any of 2300 car troubles in a jiffy! Over 3 Million copies sold!

### Same Free Offer on NEW TRUCK REPAIR MANUAL

Covers every job on every popular gasoline-powered truck made 1952-1960 plus GM, Mack and Cummins Diesels.



**TRY BOOK FREE 7 DAYS** — Send no money. Just mail coupon (paste on postcard for FASTER action). Use Manual for whole week, free. If not greatest time and money-saver you've ever seen — return book in 7 days and owe nothing! Mail coupon TODAY to: MOTOR Book Dept., Desk 027, 250 W. 55th St., New York 19, N. Y. (Schools, Bookstores: write for discounts.)



ALL AUTOMATIC TRANSMISSIONS fully covered.



More than 2800 pictures make every operation easy as ABC.



Diagrams, tables, text take "mystery" out of ignition systems.

**MAIL COUPON NOW FOR 7-DAY FREE TRIAL**  
(Attach to postcard for faster action)

**MOTOR BOOK DEPT.**

Desk 027, 250 W. 55 St., New York 19, N. Y.

Rush to me at once (check box opposite book you want):

☐ **MOTOR'S New AUTO REPAIR MANUAL.** If O.K., I will remit \$2 in 7 days, \$2 monthly for 2 months and a final payment of \$1.95 (plus 45c delivery charges) one month after that. Otherwise I will return the book postpaid in 7 days. (Foreign price, remit \$10 cash with order.)

☐ **MOTOR'S New TRUCK REPAIR MANUAL.** If O.K., I will remit \$3 in 7 days, and \$2 monthly for 3 months, plus 45c delivery charges with final payment. Otherwise I will return book postpaid in 7 days. (Foreign price, remit \$11 cash with order.)

Print Name..... Age.....

Address.....

City..... Zone..... State.....

☐ Check box and save 45c delivery charge by enclosing WITH coupon in envelope entire payment of \$7.95 for Auto Repair Manual (or \$9 for Truck Repair Manual) plus sales tax. Same return-refund privilege.



# AUDELS GUIDES

No. 1	AUTOMOBILE MECHANICS GUIDE. 1132 Pages.....	\$ 6.00
No. 2	HOME APPLIANCE SERVICE GUIDE. 864 Pages.....	6.00
No. 3	TV & RADIO SERVICE LIBRARY. 2 Book Set.....	8.00
No. 4	HANDY BOOK OF ELECTRICITY. 1052 Pages.....	5.00
No. 6	PLUMBERS & STEAMFITTERS GUIDES. 4 Book Set.....	8.00
No. 8	CARPENTERS & BUILDERS GUIDES. 4 Book Set.....	8.00
No. 9	DIESEL ENGINE MANUAL. 640 Pages.....	3.00
No. 10	WELDERS GUIDE. 608 Pages.....	3.00
No. 11	MATHEMATICS MADE EASY. 672 Pages.....	3.00
No. 12	MACHINISTS & TOOLMAKERS HANDBOOK. 1250 Pgs.....	6.00
No. 13	WIRING DIAGRAMS. 304 Pages.....	2.00
No. 14	REFRIGERATION & AIR CONDITIONING. 1360 Pages.....	6.00
No. 15	ELECTRIC LIBRARY. 10 Volume Set.....	20.00
No. 25	BLUE PRINT READING. 448 Pages.....	3.00
No. 26	MASONS & BUILDERS GUIDES. 4 Book Set.....	8.00
No. 27	ELECTRIC MOTOR GUIDE. 1056 Pages.....	5.00
No. 28	OIL BURNER GUIDE. 416 Pages.....	2.00
No. 29	SHEET METAL PATTERN LAYOUTS. 1152 Pages.....	7.50
No. 30	SHEET METAL WORKERS HANDY BOOK. 448 Pages.....	2.00
No. 43	DO-IT-YOURSELF ENCYCLOPEDIA. 2 Book Set.....	8.95
No. 44	NEW MECHANICAL DICTIONARY. 712 Pages.....	6.95

## 7-DAY FREE EXAMINATION

SEND NO MONEY—Pay the postman nothing! We'll send you any of the Audel Guides for FREE examination in your home. If you decide to keep the books you may pay for them under our easy-pay plan of only \$2 a month.

## HERE IS ALL YOU DO

IT'S EASY TO ORDER: In the No-Risk Mail Order Coupon below you need only draw a circle around the number of Audel Guides you want. We will send them to you at once. If you are not completely satisfied, return the books to us.

## MAIL THIS COUPON TODAY!

THEO. AUDEL & CO. — Self Improvement Publishers Since 1879  
49 W. 23rd Street, New York 10, N.Y.

57

Please mail me for 7 days' FREE EXAMINATION the books I have circled. I agree to mail \$2 in 7 days on each book or set ordered, and to further mail \$2 a month on each book or set ordered until I have paid the purchase price, plus shipping costs. If I am not completely satisfied with my Audel Guides I may return them.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

OCCUPATION \_\_\_\_\_

EMPLOYED BY \_\_\_\_\_

1 2 3 4 6 8 9 10 11 12 ☐ Check Here for Free  
13 14 15 25 26 27 28 29 30 43 44 Complete Catalog

☐ SAVE SHIPPING COSTS! Check here if you enclose complete payment with order. We pay postage charges. You have same return privilege.

## BREAK INTO ENGINEERING

A career in Engineering may be closer than you think, regardless of your present job. The I.C.S. method makes it possible for you to earn while you learn, to qualify for promotion step by step—from Draftsman to Designer to Technician to Engineer. Sound interesting? Then mail the coupon today!

INTERNATIONAL CORRESPONDENCE SCHOOLS  
Dept. 77659G, Scranton 15, Pa.

Please send me 3 FREE booklets: (1) "How to Succeed," (2) opportunity catalog in subject checked below, (3) sample I. C. S. lesson.

- |                                       |                                      |  |
|---------------------------------------|--------------------------------------|--|
| <input type="checkbox"/> Aeronautical | <input type="checkbox"/> Electrical  | <input type="checkbox"/> Metallurgical |
| <input type="checkbox"/> Architecture | <input type="checkbox"/> Electronics | <input type="checkbox"/> Petroleum     |
| <input type="checkbox"/> Chemical     | <input type="checkbox"/> Industrial  | <input type="checkbox"/> Radio-TV      |
| <input type="checkbox"/> Civil        | <input type="checkbox"/> Mechanical  | <input type="checkbox"/> Other         |

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

## BE A CLAIM INVESTIGATOR

### INVESTIGATE ACCIDENTS!

Many earning \$750 to \$1000 a month. Thousands of insurance companies, steamship lines and Government Offices need Claim Investigators. Also big opportunities for your own spare time business. We train you at home. National Placement Service FREE of extra charge. Bill King writes: "Your course has paid off for me with large earnings. You can quote me — your Adjuster Training Course is worth many times the cost." Write TODAY for FREE book.

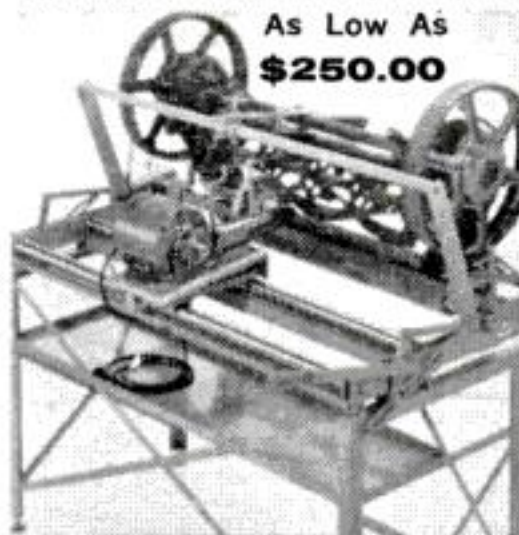
### UNIVERSAL SCHOOLS

University Park, Dept. PS-7, Box 8202, Dallas 5, Texas



## MAKE EXTRA CASH

### SHARPENING LAWN MOWERS THE MODERN WAY



As Low As  
**\$250.00**

Start your own shop! Full or spare time. Earn many dollars in a short time... average \$5.00 per hour. Many mowers need sharpening. With MODERN'S Extra Heavy Duty LAWN MOWER SHARPENER AND BED KNIFE GRINDER you have 6 machines in one. All operations are done quickly and easily. You make money from the start. Write for free details.

### MODERN MFG. CO.

160 N. Fair Oaks Ave. Dept.  
Pasadena, California 11-5

## REAL ESTATE BE A BROKER

PAY BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW! Graduates report making substantial incomes. Start and run your own business quickly. Men, women of all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, and related subjects. STUDY AT HOME or in classrooms in leading cities. Diploma awarded. Write TODAY for free book! No obligation.



Approved for World War II and Korean Veterans  
**WEAVER SCHOOL OF REAL ESTATE (Est. 1936)**  
20205 Grand Ave. Kansas City, Mo.



## Locksmithing AND KEY MAKING

### Now Made Easy! Practical up-to-date course

teaches you how to pick locks, de-code, make master keys, repair, install, service, etc. New self-instruction lessons for every handyman, homeowner, carpenter, mechanic, service station operator, fix-it shop, hardware dealer, gunsmith. 53 easy illustrated lessons. Full price only \$5.95, postpaid; or C.O.D. plus postage. Satisfaction or refund guaranteed.

Complete course \$5.95  
... now only \$5.95  
**Nelson-Hall Co., Dept. GP-1**  
210 S. Clinton St., Chicago 6, Ill.

## PROFIT IN YOUR SPARE TIME

### FIX SMALL GASOLINE ENGINES

Outboard • Powermower • Chain Saw • Tractor

### MAKE EXTRA MONEY—

or, repair your engines and SAVE. Illustrated, easy-to-understand, Home Study Course. FREE information. Write TODAY!



**LINCOLN TECHNICAL INSTITUTE**  
Suite 7-G, 472 Market Street, Newark 5, New Jersey

## JEEP OWNERS

### Re-Power NOW with a V-8 or 6 Cyl engine—Use

Ford • Chev • Mercury • GMC • Pont • Stude • Dodge or Plymouth in Jeeps, Jeepsters, Sta-Wgn, Trucks, Kaiser & H. J. cars. Conversion kits \$45.35 to \$56.90. Want fast action? Give us full information, send \$15.00 Dep. and we will ship correct kit. Bal. COD. Send full amount for prepaid shipment. Wire, phone or write today. Details FREE.

### HOOSIER MACHINE PRODUCTS CO.

314 S.E. 6th St. Phone CR6-3442 Pendleton, Oregon

## PONY EXPRESS

100 years ago the first "Pony Express" mail service was started from St. Joseph, Mo., to Sacramento. On July 19 the Post Office Dept. will issue a new stamp to commemorate this historic beginning of postal service in the west. We will send you a beautiful engraved envelope carrying this new stamp for only 25c. It will be posted on its first day of issue at Sacramento and will be flown in a US Air Force Jet over the original route to St. Joe before it is delivered to you. This will be an historical envelope of outstanding interest and beauty and will show the special markings of the Post Office for the occasion. Special this month—10 all different First Flight JET AIRMAIL covers for only \$4.95. Money back if not completely satisfied. Ask for other lists.

**K. M. WALSH Box 308-G TUCKAHOE, N. Y.**



# Shrinks Hemorrhoids New Way Without Surgery Stops Itch—Relieves Pain

For the first time science has found a new healing substance with the astonishing ability to shrink hemorrhoids and to relieve pain—without surgery.

In case after case, while gently relieving pain, actual reduction (shrinkage) took place.

Most amazing of all—results were so thorough that sufferers made astonishing statements like "Piles have ceased to be a problem!"

The secret is a new healing substance (Bio-Dyne\*)—discovery of a world-famous research institute.

This substance is now available in *suppository* or *ointment* form under the name *Preparation H*.\* Ask for it at all drug counters—money back guarantee.

\*Reg. U.S. Pat. Off.

## 75 POWER TELESCOPE \$3.98 25X-45X-75X

New 3 in one telescopes, 3 variable 25X-45X-75X magnification. Brass bound, 25 power for ultra bright images 45 & 75 power for long range. Guaranteed to bring distant stars, moons, objects, sports 75 times closer.



CRITERION CO., Dept. PSB-85 331 Church St., Hartford, Conn.

## LEARN UPHOLSTERY

**EARN MORE MONEY**  
YOU'RE IN BUSINESS RIGHT OFF—Practical course, complete upholsterer's tools, materials, frames, all you need to earn while you learn **AT HOME**. N. Y. State-approved training in upholstery, slip covers, etc. **Big Opportunity Field**. FREE Illust. Catalog, FREE Sample Lesson. Write Today. Approved for Vets. Accredited by N.H.S.C.

Upholstery Trades School, Dept. ML-1612, 721 Broadway, New York 3, N.Y.

## LAW FREE BOOK THE LAW TRAINED MAN

Write today for a FREE copy of illustrated law book, "THE LAW-TRAINED MAN," which shows how to earn the professional Bachelor of Laws (LL.B.) degree through home study of the famous Blackstone Law Course. All necessary books and lessons provided. Moderate cost; convenient monthly terms. Write for FREE law training book today.

**Blackstone School of Law, 307 N. Michigan Ave.**  
Founded 1890 Dept. 120B, Chicago 1, Illinois

## FREE

### Full year's subscription to RADIO SHACK'S Sensational ELECTRONICS CATALOGS

Send coupon at once! See world's largest and best line of electronic equipment. Stereo, hi-fi, ham radio, tapes—over 100,000 items for pro or amateur—all at money-saving prices. 15-day no-risk home trial on any item.

### MAIL COUPON NOW!

Radio Shack Corp., 730 Commonwealth Ave., Boston 17, Mass. Dept. 60-64  
Without further request, send latest catalog plus every new issue for one full year—all FREE and POSTPAID.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
Post Office \_\_\_\_\_  
or City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

# This is Man's Work!



## HEAVY EQUIPMENT OPERATION

...here's your opportunity for a real future! Gigantic construction projects will demand trained operators for years to come!

## MEN, 18-45—TRAIN NOW!

No experience needed to start... Northwest trains you thoroughly...



Learn technical fundamentals during free hours—advance as quickly as you wish. No need to sacrifice earnings while learning!



Practical experience on earth-moving equipment such as tractors, scrapers, graders, carry-alls, loaders, etc.

This combination training turns out operators who can produce... operators with know-how plus technical knowledge.

### COMPLETE TRAINING PROGRAM—including:

- Operation of Equipment
- Safety & Maintenance
- Control Systems
- Highway Construction
- Engineering Fundamentals
- Grade & Grade Stakes
- Blueprint Reading

### START YOUR TRAINING TODAY!

Mail Coupon for Information

**HEAVY EQUIPMENT DIVISION • Dept. S-7**  
Northwest Schools, 1221 N.W. 21st Ave., Portland 9, Ore.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

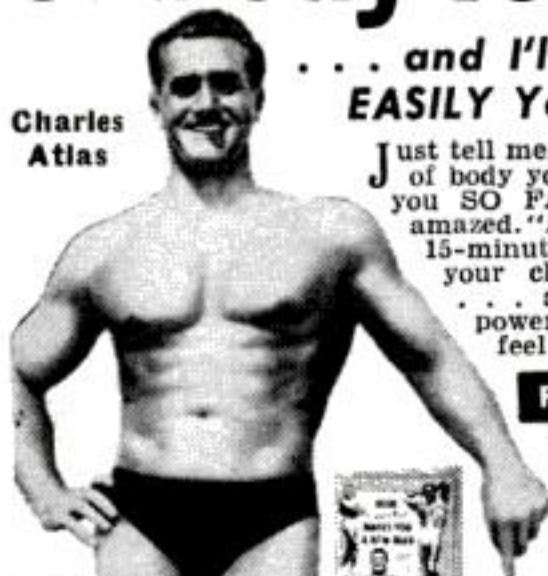
Phone \_\_\_\_\_ Age \_\_\_\_\_

**NORTHWEST SCHOOLS, INC.**

FOUNDED 1946



# Check the Kind of Body You Want



Charles Atlas

... and I'll Show You How EASILY You Can Have It!

Just tell me, in coupon below, the kind of body you want—and I'll give it to you SO FAST your friends will be amazed. "Dynamic Tension," my easy, 15-minutes-a-day method, will make your chest and shoulders bulge ... arms and legs surge with power ... your whole body feel "alive!"

**FREE BOOK** Learn how I became "World's Most Perfectly Developed Man"—Mail coupon! CHARLES ATLAS, Dept. 17, 115 East 23rd Street, New York City 10, N. Y.

**CHARLES ATLAS, Dept. 17, 115 East 23rd St., New York 10, N. Y.**

In England: Chitty Street, London, W.1.

Dear Charles Atlas: Here's the Kind of Body I want:

(Check as many as you like)

- |  |  |
|--|--|
| <input type="checkbox"/> More Weight—Solid—in the Right Places | <input type="checkbox"/> Powerful Arms, Legs, Grip |
| <input type="checkbox"/> Broader Chest, Shoulders              | <input type="checkbox"/> Slimmer Waist, Hips       |
|  | <input type="checkbox"/> Better Sleep, More Energy |

Send me absolutely FREE a copy of your famous book showing how "Dynamic Tension" can make me a new man—32 pages, crammed with photographs, answers to vital questions, and valuable advice. No obligation.

NAME \_\_\_\_\_ AGE \_\_\_\_\_  
(please print or write plainly)

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

## ROCKET PLANS

### BUILD YOUR OWN 1 and 2 Stage Large and Small

Our 12 page, illustrated booklet includes:

- Complete Rocket Construction
- Various Solid Fuel Mixtures
- Electrical Firing System
- Launching Platform
- Principles of Rocket Propulsion And Stability
- How to Measure Firing Height
- Safety Rules

And many other features for 3/4 to 3 1/2 in. diameter rockets. Our plans are designed for high altitude performance

All of this and more in one book. **SATISFACTION GUARANTEED**

Immediate Delivery

**NOT A TOY!**

Rockets Dept. D-9  
4106 Beecliff Drive  
Columbia 5, S. C.

Only \$1.00

## MEN PAST 40

**Afflicted With Bladder Trouble, Pains in Back, Hips, Legs, Nervousness, Tiredness.**

If you have these troubles, particularly bladder trouble, then your condition may be traced to Glandular Inflammation ... a constitutional disease. Neglect of this condition often leads to premature old age and sometimes incurable malignancy.

The Excelsior Medical Clinic has a **New Free Book** that tells how thousands of men have been successfully treated here at Excelsior Springs for Glandular Inflammation by **NON-SURGICAL Methods**. They found soothing relief and a new outlook in the future of life.

This **Free Book** may prove of utmost importance in your life. Write Today. There is no obligation.

**Excelsior Medical Clinic Dept. B6229 Excelsior Spgs., Mo.**



**"\$10,784 IN ONE YEAR"**

**SERVICING RADIATORS!**

—Sidney Rad. Shop, Sidney, Mont.

Make good money servicing auto-truck-tractor radiators. Easy to learn. Inland, world's largest radiator equip. mfr., offers complete package — equipment merchandising, "Pays-for-itself" Purchase Plan, free training. Small down payment on equipment starts you. Profitable dept. for garage or service station. Write:

**INLAND MFG. CO., Dept. PSM-7, 1108 Jackson St., Omaha 2, Nebr.**



**LEARN**

### MEAT CUTTING

Train quickly in 8 short weeks at Toledo for a bright future with security in the vital meat business. Big pay, full time jobs—**HAVE A PROFITABLE MARKET OF YOUR OWN!** Pay after graduation. Diploma given. Job help. Thousands of successful graduates. Our 37th

year! Send NOW for **FREE** catalog. No obligation. G. I. Approved. **NATIONAL SCHOOL OF MEATCUTTING, Dept. 51-G, Toledo 4, Ohio**

### Hotels Call for Trained Men

Record-breaking travel means nation-wide opportunities and a sound substantial future for trained men in the hotel, motel and hospitality field. Fascinating work; fine living; quick advancement. You can qualify at home or through resident classes in Washington. Previous experience proved unnecessary. Placement Service **FREE**. Write for **FREE** Book, "Your Golden Opportunity." Accredited by N.H.S.C.

Course Approved for ALL Veteran Training. 44th Year. **LEWIS HOTEL TRAINING SCHOOL, Room FL-9712, Wash. 7, D.C.**

**MAKE MONEY!**

**REPAIR HYDRAULIC JACKS**



**Earn While You Learn At Home**

Make up to \$5 an hour, full or part-time, in the competition-free field of Hydraulic Jack Repair. Millions of jacks in auto service stations, truckers, body shops, riggers, farms, need servicing. We show you **HOW**. Easy step-by-step directions.

Write for Folder PS-7, and Free Bonus Offer

**Institute of Hydraulic Jack Repair**

P.O. BOX 50 • BLOOMFIELD, N. J.

A Correspondence School Licensed by N.J. Bd. of Ed.





# like to doodle?

Does a pencil in your hand start you doodling? Then you may have talent enough for a money-making career in art. Find out, free! Take the simple Art Talent Test that has started thousands toward successful careers. Trained artists are needed for advertising, illustrating, cartooning. Find out now whether an art career is for you. Write, today, for Talent Test. Free, no obligation.



TAKE FREE ART TALENT TEST

**ART INSTRUCTION, INC., STUDIO 7140**  
500 South 4th Street, Minneapolis 15, Minnesota

Please send me your Talent Test, without cost or obligation. (PLEASE PRINT)

Name \_\_\_\_\_ AGE \_\_\_\_\_  
Address \_\_\_\_\_ Apt. \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ County \_\_\_\_\_  
State \_\_\_\_\_ Occupation \_\_\_\_\_

**make your own Gems** 36<sup>50</sup> FOB

The Gem Maker comes complete with all necessary equipment, including a super-charged diamond blade for sawing, and all the wheels for grinding, shaping and polishing; also complete instructions. The complete equipment as shown, less motor and belt for only \$36.50, f.o.b., Burlington, Wisconsin. Write today for information and literature.

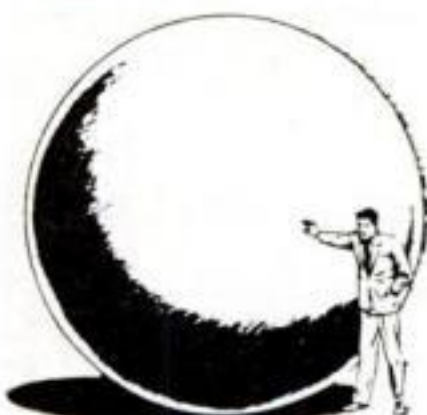
**B&I MANUFACTURING CO.**  
Dept. S, Burlington, Wis.

**SHORTHAND IN 6 WEEKS**

Famous SPEEDWRITING shorthand. 120 words per minute. No symbols; no machines; uses ABC's. Learn at home or through classroom instruction. Low cost. 500,000 graduates. For business and Civil Service. Typing available. 37th Year. Schools in over 400 cities. Write for FREE booklet.

**Speedwriting** Dept. 2607  
55 W. 42 St., N.Y. 36, N.Y.

## GIANT 30 Ft. \$2



Inflate to Giant 20 to 30 ft. diameter with air or Gas. Fun at Beach Water Sports etc. Flying Advt. visible for miles. Terrific for attracting crowds at Openings, Fairs, Roadside Stands, Gas Stations, Sports Events. Use as Water Markers and Buoys. Made of Genuine Neoprene Rubber for extra durability. Never Used. Orig. cost U.S. Govt. \$20.00. Limited quantity. Special offer only \$2.00 each plus 50c each postage & handling charge (5 for \$10.00) complete. 6 ft. size 59c ea. (2 for \$1.00). 10 ft. size \$1.00 ea. (6 for \$5.00). No C.O.D.'s.

**NOVEL MFG.** 33 2nd Ave., Dept. G-3229  
New York 3, New York

## ENGINEERING



U.S. AIR FORCE Photo. Missile headed for outer space. Courtesy of Space Technology Laboratories, Inc.

Enroll Now for New Term  
Heald College Ranks FIRST  
West of the Mississippi in  
"Who's Who in America"  
Send for FREE information

Select any one of the 15 Modern Engineering Courses listed below. Any one of them will lead you to a Successful, Safe, and Secure Lifetime Career.

### BACHELOR OF SCIENCE DEGREE, 30 MONTHS

SAVE 2 YEARS' TIME

B.S. Degree Courses:

- ☐ Electronic Engineering
- ☐ Electrical Engineering
- ☐ Highway Engineering
- ☐ Mechanical Engineering
- ☐ Structural Engineering
- ☐ Civil Engineering
- ☐ Architecture

Diploma Courses:

- ☐ RADIO-TELEVISION Plus Color TECHNICIAN
- ☐ Electronic Technician
- ☐ Industrial Electronic Tech.
- ☐ Die and Tool Design
- ☐ Architectural Drafting
- ☐ Mechanical Drafting
- ☐ Structural Drafting

Approved for Veterans

### HEALD Engineering College

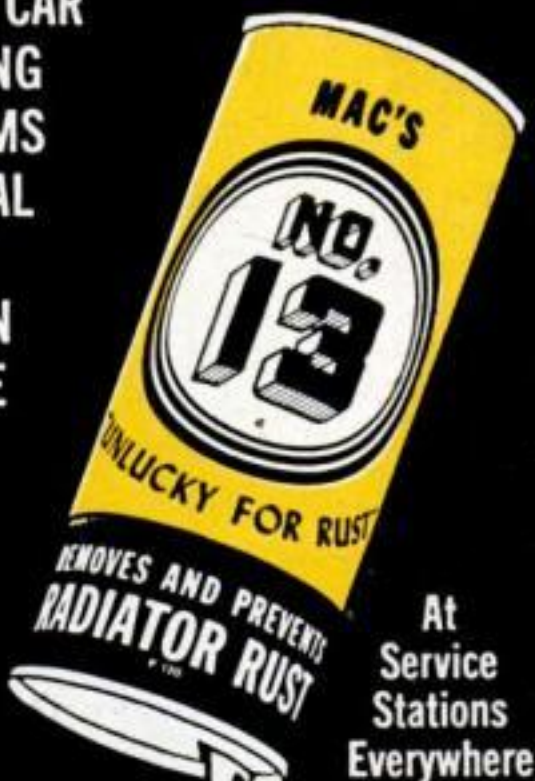
Van Ness at Post, Dept. PS-760

San Francisco, California

NAME \_\_\_\_\_  
STREET \_\_\_\_\_  
CITY \_\_\_\_\_  
STATE \_\_\_\_\_



KEEPS CAR  
COOLING  
SYSTEMS  
CRYSTAL  
CLEAR  
FOR AN  
ENTIRE  
YEAR



At  
Service  
Stations  
Everywhere

**Unlucky for rust!**

## LEARN ELECTRONICS RADIO-TELEVISION BY PRACTICING AT HOME



Growing industrial, civilian and military uses open attractive opportunities. Beginners achieve career status through home study. NRI training includes practical experience with especially designed equipment. Spare time earnings can start soon. Mail coupon.

**NATIONAL RADIO INSTITUTE**  
Washington 16, D. C.

OGB

Name.....  
Address.....  
City.....Zone.....State.....

## FAST DRAW!



Three times more fast draw shooting fun—safer, anywhere, at lower cost—with the Crosman Single Action 6, .22 cal. CO<sub>2</sub> gas-powered revolver. True action... authentic styling... real gun weight, feel

Ask your Crosman Select Dealer for a free demonstration.  
**WRITE Crosman Arms Co., Inc.,**  
Dept. PS-7, Fairport, N. Y.

## MONEY ADVENTURE

can be yours NOW...

With Buried Treasures. Have the thrill of locating coins, gold and silver. New Transistorized Instruments for greater locating depth...operate on flashlight batteries...low as \$79.50. FREE literature...WRITE Today.

Authentic  
Treasure Books & Maps  
Now Available



**GOLDAK COMPANY**

1547-7 W. Glenoaks Blvd.  
Glendale 1, California



## get into operating or repairing EARTH MOVING EQUIPMENT

Men needed now for good paying jobs in booming road and construction work. Learn operating or repair-rebuilding of heavy road machinery, cranes, bulldozers, earth carriers, etc. Actual "on the job" training. 5 to 13 1/2 week courses. Classes start every Monday. Reserve your space now. Complete catalog and reservation facts FREE. Approved for veterans. Write

**Greer TECHNICAL INSTITUTE**  
Attn: S.G. Hutch, Box 368, Braidwood, Ill.

## ASTRONOMICAL REFLECTOR TELESCOPE PARTS!

BIG NEW  
64 PAGE  
CATALOG  
50c  
(refundable on  
first order,  
\$5 or more)



Before you buy telescopes... Know telescopes! Our BIG 64 page catalog shows you every part and accessory imaginable including mirror kits, our famous line of complete TRECKER telescopes, various models of refractor telescopes... also microscopes, riflescopes, spotting scopes, etc. Largest selection of books on Astronomy. Interesting and informative, explains what's really important... **POWER or RESOLUTION** in your telescope! Don't delay, send 50c now for this information-packed catalog from the nation's foremost telescope manufacturer. Est. 1933.

**COAST INSTRUMENT, INC.**  
Dept. L, 4811 Long Beach Blvd., Long Beach 5, Calif.

Dealers Inquire



**\$3.25 or 2 FOR \$6.00!**

With 40 ft. of wire. Additional wire 3c a ft.

TESTED AND GUARANTEED

Write for free list of all types of telephones.  
Shipments F.O.B. Simpson, Pa.

**TELEPHONE ENGINEERING CO.**

Dept. 7AO

Simpson, Pa.

## Broken or Loose FALSE PLATE?



Fix it Yourself EASILY in a Few Minutes

Your plates may become broken or loose just when you need them most. With FIX-IT-KIT you can repair your own broken plates. Also tightens loose fitting plates, easily. Get permanent comfort with professional material. Complete instructions. Satisfaction guaranteed or your money refunded. Order Now at a new low price only **\$2.98** postpaid — or sent C.O.D.

**Make Plates Like New**  
DENT-FIX DENTAL PRODUCTS, Dept. 129, Box 674, Kansas City 41, Mo.

## When Writing to Advertisers Please Mention Popular Science

## EXCLUSIVE DOUBLE-BEARING HEAVY DUTY PUMPS



IRRIGATE • DRAIN • CIRCULATE • SPRAY  
Use 1/4 HP motor or larger... 1 HP for up to 5,200 GPH; 1,000 GPH 60" high; or 3,000 GPH from 25' well. 1 1/4" inlet; 1" outlet. Stainless shaft. TYPE X—2 oil-less bronze bearings. Won't rust. **\$10.95**

TYPE XB—Ball bearing model. **\$12.95**

Best for belt drives. Postpaid if cash with order.

Don't delay—send for yours today!

**MONEY BACK GUARANTEE**  
Centrifugal and Gear Pumps in All Sizes

LABAWCO PUMPS, Belle Mead 4, N. J.



**PROTECT YOURSELF**  
with this Fountain Pen-Type **POCKET TEAR GAS**

DEVICE...\$15 VALUE 38 Special Cal.  
**\$5.95** Exp. Additional Col. shells 50c ea.  
with 1 shell

For police or civilian defense against robbers, mashers, etc. Causes no permanent injury. Highly polished heavy nickel case with spring-steel pocket clip.

**SEND CHECK OR MONEY ORDER. NO COD'S**

This Product is not intended for sale in states or localities which have laws forbidding their sale.

**PUBLIC SPORTS SHOPS, DEPT. P-1 11 S. 16th St., Phila. 2, Pa.**



Nickel Plated Peerless Type  
**HANDCUFFS**  
\$15.00 value **\$7.95** SPECIAL pr.  
Deluxe leather carrying case \$2.50

Registered Colt Distributors  
Suppliers for  
Official Police Equipment

*This one's really built!* **MFG**

Its tough MOLDED FIBER GLASS lapstrake hull is molded under heat and high pressure in matched metal dies... reinforced with 3 aluminum beams, an aluminum keel, several dozen crosswise fiber glass ribs. COMPARE THIS WITH ANY OTHER FIBER GLASS BOAT! Then compare performance, beauty, cost. You'll buy "MFG". 5 sizes, 12 models. Write for literature.



**MOLDED FIBER GLASS BOAT COMPANY** 83 Fourth Avenue, Union City, Pennsylvania

**Superior's New Model 70 UTILITY TESTER®**  
**FOR REPAIRING ALL ELECTRICAL APPLIANCES**  
**MOTORS • AUTOMOBILES • TV TUBES**

As an electrical trouble shooter the Model 70:



- Will test Toasters, Irons, Broilers, Heating Pads, Clocks, Fans, Vacuum Cleaners, Refrigerators, Lamps, Fluorescents, Switches, Thermostats, etc.
- Will test all TV tubes for open filaments, inter-element shorts, burned out tubes, etc.
- Measures A.C. and D.C. Voltages, A.C. and D.C. Current, Resistances, Leakage, etc.
- Will measure current consumption while the appliance under test is in operation.
- Incorporates a sensitive direct-reading resistance range which will measure all resistances commonly used in electrical appliances, motors, etc.
- Leakage detecting circuit will indicate continuity from zero ohms to 5 megohms (5,000,000 ohms).

As an Automotive Tester the Model 70 will test:

- Both 6 Volt and 12 Volt Storage Batteries • Generators • Starters • Distributors • Ignition Coils • Regulators • Relays • Circuit Breakers • Cigarette Lighters • Stop Lights • Condensers • Directional Signal Systems • All Lamps and Bulbs • Fuses • Heating Systems • Horns • Also will locate poor grounds, breaks in wiring, poor connections, etc.

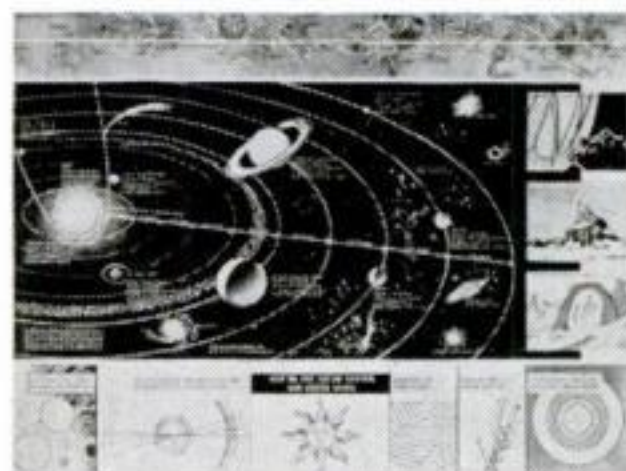
Model 70 comes complete including 64 page book, only... **\$15.85**

**SHIPPED ON APPROVAL**  
**NO MONEY WITH ORDER - NO C. O. D.**

Try it for 10 days before you buy. If completely satisfied then send \$3.85 and pay balance at rate of \$4.00 per month for 3 months — No Interest or Finance Charges Added! If not completely satisfied, return to us, no explanation necessary.

**MOSS ELECTRONIC, INC.**  
Dept. D-775, 3849 Tenth Ave., New York 34, N. Y.  
Please rush Model 70. If satisfactory, I will pay on terms specified. Otherwise I will return tester.

Name.....  
Address.....  
City.....Zone.....State.....  
All prices net, F.O.B., N. Y. C.



1. SOLAR SYSTEM



2. THE WORLD



3. UNITED STATES

# 3 Giant Wall Maps All for **\$1.00** only (A \$3 VALUE)

EACH 3 FT. x 4 FT.! Lithographed in 12 Colors... Striking Wall Decorations... of great Educational Value to Children.

1. **MAP OF SOLAR SYSTEM & OUTER SPACE** shows all 9 planets: diameter, distance from sun, length of day, axis tilt, galaxies, star clusters, signs of zodiac, surfaces of Mars, Titan, Venus.

2. **UNIVERSAL MAP OF WORLD** gives every border, sovereignty change since World War II. Also polar regions, all 24 time zones, deserts, mountains, rivers, oceans, islands.

3. **BRAND-NEW 50-STATE MAP OF U.S.A.** shows all 50 states; includes Alaska, Hawaii; all State capitals, rivers, deserts, mountains, Indian reservations, even Puerto Rico and Virgin Islands.

## Mail Coupon on Money-Back Guarantee

Bargain offer saves you \$2 on regular price. But supplies are limited. Order today; money back within 10 days if not delighted. (Order extra sets as gifts.) Send coupon now.

**Book Enterprises, Inc., Dept. P-1**  
**310 E. 44 Street, New York 17, N. Y.**

I enclose \$..... for ..... set(s) of World-U.S.A.-Space Maps at \$1 per set postpaid. If not completely satisfied, I may return maps within 10 days for full refund.

Name.....  
(please print)

Address.....

City.....Zone.....State.....



Send for your **FREE**

**HEATHKIT**

**1960 CATALOG**

# HI-FI, HAM RADIO MARINE... TEST

Over 150 do-it-yourself electronic kits are illustrated and described in this complete Heathkit Catalog.



**DO-IT-YOURSELF... IT'S FUN**  
**IT'S EASY & YOU SAVE UP TO 1/2**

HEATH COMPANY/Benton Harbor 16, Mich.

**DAYSTROM, INCORPORATED**

Please send the FREE Heathkit Catalog.

NAME

ADDRESS

CITY

ZONE

STATE

MY SPARE TIME HOBBY MAKES ME

**\$5<sup>00</sup> an hour**  
**CASH PROFIT**

—Grover Squires



## START YOUR OWN SPARE TIME BUSINESS

You can turn your spare time into Big Cash Profits with your own **COMPLETE SHARPENING SHOP**... Grind saws, knives, scissors, skates, lawn mower blades... all cutting edges. Your Own Cash Business with no inventory right at home... no experience needed.

**FREE BOOK** tells how you can start your own spare time business while you are still working at your regular job. Low Cost—time payments only \$15.00 a month. Send postcard today.

**BELSAW SHARP-ALL CO.**, 701 Field Bldg., Kansas City 11, Mo.

## Hi-Speed Automatic Electric PAINT SPRAYER

**CLOSEOUT SPECIAL!**

Big, heavy-duty type! Fast-action trigger. Plug in & spray! Powerful motor pump! Swivel nozzle sprays up, down, left, right, sideways without tilting jar! Adjusts from mist to spray. Metal parts **STAINLESS STEEL** & brass. Breeze thru painting jobs in minutes while others take hours. Many uses—mothproof clothes, touch-up fender scratches, refinish furniture, spray insecticides, etc. 50,000 sold at much higher price! Rush check, cash or m.o. for prompt delivery anywhere. COD's plus 50¢ COD fee. (Enclose \$1 deposit). Satisfaction guaranteed or money refunded. Sold only by mail, only by us at this direct-to-you price. No. 95 Hi-Speed Electric Sprayer \$5.44 plus 50¢ mailing cost. **TOTAL: \$5.94. DELUXE MODEL**, aluminum jar, etc. only \$6.94 complete. Order today. Supply limited.



Same Type Orig.  
Adv. on TV for

**\$19.95**

**\$5.44**

PLUS POST.

**THORESEN, Inc., Dept. 7-G-95**

585 Water St., New York 2, N.Y.

# How to get more fish... revealed in great \$1.00 book!

"Worth its weight in gold!"—that's what you'll say about the **OUTDOOR LIFE FISHING BOOK** by P. A. Parsons. This fact-and-photo filled book tells how, where, and when to get more trout, bass, panfish, muskie, salmon, grayling, pike, pickerel, walleye, and every other fresh water sport fish in America! Over 100 pictures, 25 chapters jammed with practical show-how data on fly casting, bait casting, spinning, trolling, wet and dry fly know-how, bugs and poppers, natural baits, ice-fishing, knots, boats, and lots more. And the **OUTDOOR LIFE FISHING BOOK** is yours for **JUST \$1.00 postpaid!** Send name, address, \$1.00 to:

**Outdoor  
Life**

Dept. PS-760

355 Lexington Avenue, New York 17, N. Y.

# Get a goldmine of hunting and shooting know-how in great \$1.00 book

Jack O'Connor, Shooting Editor of Outdoor Life Magazine, and America's top gun expert, hands you a million dollars worth of gun and shooting know-how in his **OUTDOOR LIFE SHOOTING BOOK**. It's packed with inside tips, expert advice on small-bore rifles, big game rifles, shotguns, handguns, ammunition, scopes, sighting, chokes and patterns, plenty more. Lavishly illustrated with 100 photos, diagrams, trajectory tables, ballistics charts, etc. Large format, fully indexed, handsomely printed—worth its weight in gold! And the **OUTDOOR LIFE SHOOTING BOOK** is yours for **JUST \$1.00 postpaid!** Act fast! Send name, address, \$1.00 to:

**Outdoor  
Life**

Dept. PS-760

355 Lexington Avenue, New York 17, N. Y.





"A week ago I could hardly draw a straight line!"

## QUALIFY FOR A BETTER JOB WITH NEW SPACE-AGE INDUSTRIAL DRAWING SYSTEM

Amazing new and faster method of 3-dimensional mechanical sketching—for men ambitious to qualify for more important positions in modern industry. Helps you to get a job, hold it

against competition, advance quickly to positions of greater responsibility at higher pay. Ability to "talk with a pencil" is tremendously valuable to production workers, factory service men, office personnel, and practically everyone in industry today. It's vitally necessary for all building tradesmen. Even helpful to sales people in such fields as house furnishing, interior decorating, and others where ability to make a quick sketch often cinches an order. Sketch-Easy method used in U. S. Armed Forces and many large industries for up-grading personnel. Not a long-drawn-out drafting course, but a quick short-cut to accurate 3-dimensional sketching—so easy you can start cashing-in on your skill in a week.

No art ability needed. Write TODAY for complete FREE details.

**ASSOCIATED AERO SCIENCE LABORATORIES, INC.**

Dept. A-7 (Training Service Division), 250 S. Prairie Ave., Hawthorne, Calif.

<b>MASS PRODUCTION</b> MAKES THESE PRICES POSSIBLE <b>EASY TERMS</b> FREE COLOR CATALOG	<b>18 FT. CRUISER KIT</b> WITH ONE-PIECE FIBERGLAS CABIN ONLY <b>\$520</b>
---	---



**TAFT MARINE WOODCRAFT**  
Dept. PS-760 636 39th Ave. N.E., Minneapolis 21, Minn.

**MAKE VACATION TIME ALL PLEASURE TIME**

**DRIVE WITH A HULL AUTO COMPASS**  
No Lost Directions, Wasted Time and Miles

<i>Beaconlite</i>	<i>Streamline</i>
<b>\$6.95 \$7.50</b>	<b>\$5.95 \$6.50</b>

At your dealer's or write for lit.  
**FAMOUS AUTO AND BOAT COMPASSES**

**HULL MFG. CO. Box 246-E-7, Warren, Ohio**



**I MADE \$1,000**

**... On Imports!** In one day that was profit on small mail orders shipped from abroad. I show you how to start this big profit business from your home in spare time. (No merchandise investment needed). Write today for Free details and list of 157 imports to: **B. L. MELLINGER, Dept. C247, 1717 Westwood Blvd., Los Angeles 24, Calif.**



**LEARN PLASTICS**

**COMPLETE LOW COST SHOP METHOD HOME TRAINING NOW AVAILABLE**

Get in on Big Money opportunities in Plastic molding, casting, forming, carving, etc. Earn as you learn with Interstate's professionally prepared course. All plastic materials furnished.

**INTERSTATE TRAINING SERVICE**  
DEPT. C-2, PORTLAND 12, OREGON



**WRITE FOR FREE BOOKLET**

**GET INTO ELECTRONICS**

V.T.I. training leads to success as technicians, field engineers, specialists in communications, guided missiles, computers, radar, automation. Basic & advanced courses in theory & laboratory. Assoc. degree in 29 mos. B.S. obtainable. ECPD accredited. G.I. approved. Graduates with major companies. Start Sept., Feb. Dorms, campus. H.S. graduate or equivalent. Catalog.

**VALPARAISO TECHNICAL INSTITUTE**  
DEPT. S VALPARAISO, INDIANA

## The new *SHAPE* of a new *SOUND!*




A glass packed muffler that looks like original equipment—of popular flat oval shape—with a tone that's mellow without bellow—distinctive, but lullaby-low!

**NEW SHAPE**—Redesigned with compact flat oval, just 3 in. thick. Fits all cars snugly, with more road clearance.

**NEW SOUND**—No flat harsh blare to invite a ticket—intermediate shell and tone chamber provide muted purr.

**NEW PERFORMANCE**—Engineered to give you all the power-and-go from highest compression engines. Long service, low back pressure. Everything about it says "Go"!

*... plus these advantages!*

- Two types of fiber glass for best tone
- Double-wrapped outer shell
- Heavy-gauge steel in shell and heads
- Takes little time and work to install
- Handsome gold enamel finish

*And be sure to see the famous Silentones—original equipment type mufflers—the economical Standard or deluxe Master. Either is the biggest buy for your dollars.*

Sold only at America's leading automotive chain stores

# SILENTONE

**MUFFLERS AND PIPES**  
Dept. 4G, 619 Smith St., Toledo 1, Ohio





# BE YOUR OWN MUSIC TEACHER

Send for Free Book Telling How Easily You Can Learn Piano, Guitar, Accordion, ANY Instrument This EASY A-B-C Way



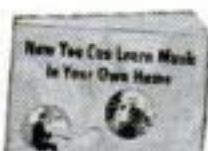
**N**OW IT'S EASY to learn music at home. No tiresome "exercises." No teacher; just **START RIGHT OUT** playing simple pieces. Thousands now play who never thought they could. Our pictured lessons make it easy as A-B-C to learn to play popular, country music, hymns, classical, and any other music. Only a few cents a lesson. Some of our 1,000,000 students like Lawrence Welk are now band **LEADERS!** Established 1898.



## Send for FREE School Catalog

Find out why our course can teach you quickly, easily, inexpensively. Write for 36-page School Catalog. No obligation. Mention your favorite instrument. Just mail coupon. (No salesman will call.)

**U. S. SCHOOL OF MUSIC**  
Studio 157, Port Washington, N. Y.



**FREE BOOK**

**U. S. SCHOOL OF MUSIC, Studio 157, Port Washington, N. Y.**  
Please send me Free 36-page Illustrated School Catalog. I would like to play (Name instrument).....

(Instruments, if needed, supplied to students at special reduced prices.)

Name ..... Age .....  
(Please Print)

Address .....

City ..... Zone ..... State .....



**save on everything in electronics**

SEND FOR **ALLIED'S BARGAIN SUPPLEMENT**

**SAVE MOST** on Stereo hi-fi systems and components, stereo records and tapes. See best buys in exciting build-your-own **KNIGHT-KITS®**. Hundreds of special values in recorders, amateur gear, P.A. systems, test instruments, TV accessories, electronic parts, tubes and tools. Send for your **FREE Allied Supplement** packed with bargains and new electronic products. Save as never before!



Exciting Money-Saving Knight-Kits



Bargains in Stereo Hi-Fi

**ALLIED RADIO**

**FREE SUPPLEMENT**

ALLIED RADIO, Dept. 63-G  
100 N. Western Ave., Chicago 80, Ill.

☐ Send **FREE Allied Supplement No. 195**

Name .....

Address .....

City ..... Zone ..... State .....

If you take

# Color Pix

8mm - 16mm - 35mm 127 • 120 • 620

You must get our **MONEY SAVING**

# Free Catalog

Listing all popular **KODAK** and **ANSCO** Film Type and Sizes . . . **WRITE TODAY!**

**SOLAR CINE PRODUCTS, Inc.**

"Direct-by-Mail" Film and 4247 S. Kedzie • Chicago 32,  
Processing Specialists for almost a quarter century" Dept. PSM



# FREE BOOKLET

"Fun and Adventure With Microscopes, Telescopes and Binoculars," plus discount catalog. For your **FREE** copy, send name and address to:

**CRAIG'S** 2705 Meadowview Dr.  
Columbus 6, Georgia



**PLANS to Build your Own**

## AEROMOBILE

7 drawings and cross-sections, 7 photos, cost of materials, specs., of first fully controllable **GEM** (ground effect machine). Basic plans, postpaid \$5.00

Dept. A **AEROMOBILE**, Neponset, Illinois



# FREE

## MUSCLE BUILDING INFORMATION

Sensational New Methods

Less Time—Less Effort—Better results  
**BODY-TONE**, Box 638-E, North Miami 61, Fla.

**When Writing to Advertisers Please Mention Popular Science**





# I'll Set You Up For Life In Your Own BIG PAY SHOE BUSINESS

With The ONE Shoe Line That Serves  
Everyone From Baby to "Pop" and "Mom"!



Only 8 orders a day can make you up to \$32.00 a day, \$180.00 a week, \$600.00 a month. It's no trick at all to make big money full or Spare Time with America's most comfortable shoes. Amazing new "Spring-Step" cushion design proves it by actual demonstration. Over 200 styles for men, women, boys, girls and infants! Profits are BIG—repeat orders sure and easy. No experience needed. No investment. Everything furnished free, including finest sales outfit and actual demonstrators! Send today for Free Outfit.



Amazing 2-Minute  
Demonstration  
Does Your Selling  
Job for You FAST!  
I Give Producers  
Their Own Shoes  
AS A BONUS!

**ORTHO-VENT SHOE CO.** 407 Brand Road  
Salem, Virginia

## MEN WANTED

Master a trade with a future—learn Auto-Diesel mechanics in our shops. You learn with tools on real equipment. Earn while you learn. Many of our graduates earn \$100 per week and up. No previous experience necessary. Day and night courses. Approved for veterans. Write for free bulletin.

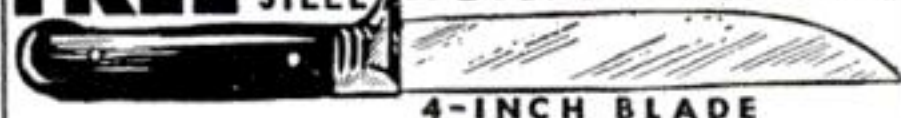
Earn \$100 Per  
Week and up  
**AUTO DIESEL  
MECHANICS**

**NASHVILLE AUTO-DIESEL COLLEGE**

226 7th Ave., N., Dept. 41

Nashville 3, Tenn.

## FREE GERMAN STEEL HUNTING KNIFE



4-INCH BLADE

We give you handiest hunting and fishing knife you've ever had! Has 4-INCH LONG highly tempered steel blade—VERY SHARP! Attractive handle. We send knife FREE to acquaint you with our below-wholesale bargains. Please send 25c for handling. NO LIMIT—but send 25c handling for each knife. Order TODAY! HUNTING KNIFE, Dept. K-495, Box 881, St. Louis, Mo.

## BUILD YOUR OWN AIR CONDITIONERS

From Junked Refrigerators for a Few Dollars  
INSTRUCTION BOOKS SHOW YOU HOW... 75c EACH  
Special Offer  
2 Bks—\$1.00  
3 Bks—\$1.50  
or all 5 for \$2.00

- "HOW TO BUILD a Low Cost Air Conditioner"
- "HOW TO BUILD an Automobile Air Conditioner"
- "HOW TO BUILD a Low Cost Home Freezer"
- "HOW TO BUILD an Electrostatic Precipitator"
- "HOW TO BUILD a Low Cost Dehumidifier"

Complete "Install-It-Yourself" Air Conditioner  
kits for home and automobile. 2 Ton capacity.  
Brand New Parts—\$92.00 and up.

Kool Engineering Co., Dept. B-7, 1318 N. Clyburn, Chicago 10, Ill.

**FREE!**  
Instructions  
and Literature  
on kits.

## FALSE TEETH

New Plate Made From Your Old—  
Returned AIR MAIL Same Day...

SEND FOR FREE INFORMATION on  
new professional method that gives you  
light, comfortable, natural-looking, perfect-fitting plate—  
upper or lower—from your old, worn, broken, loose plate without an  
impression. Work guaranteed. SEND NO MONEY—just send name,  
address, we'll rush details without obligation. State if plates are loose.  
TRU-GRIP DENTAL LAB., 127 N. Dearborn, Dept. 111, Chicago 2



LOW AS  
**\$15.95**

## 8" POWER SAW NOW ONLY \$9.95

Blade tilts—table stays level. All  
iron and steel construction. Single hand-  
wheel control. Blade raises and lowers.  
Sold direct from factory at unusual saving.  
Money back guarantee. Send for FREE  
fully illustrated booklet.

**AMERICAN MACHINE & TOOL CO.** ROYERSFORD 47, PA.



ONLY  
**\$9.95**

# RUPTURED

## YOU CAN NOW BE FREE FROM TRUSS SLAVERY

Surely you want to THROW AWAY  
TRUSSES FOREVER, be rid of Hernia  
Worries and be able to again work, live, play  
and enjoy life's activities in the manner you  
desire.

Why should you put up with wearing a grip-  
ping, chafing truss the balance of your life?  
If you do, it will not be through necessity but  
through choice on your part—for most re-  
ducible Ruptures can be corrected NON-  
SURGICALLY.

## NON-SURGICAL TREATMENTS

The successful NON-SURGICAL treatments  
of reducible Rupture used by the Excelsior  
Medical Clinic require no painful surgery,  
hospitalization, anaesthesia or long periods  
of convalescence. They have been developed  
by new techniques, new wonder drugs, re-  
search and years of experience and are fully  
recognized by medical authorities.

Thousands of satisfied patients from hun-  
dreds of communities have come here to be  
successfully treated. Our treatments are so  
certain that every patient accepted for treat-  
ment is given a Lifetime Certificate of Assur-  
ance. Treatments usually take but a short  
time and the cost is reasonable.

### Do Something Today About Your Health

The chances are if  
your condition is not  
corrected it will only  
grow worse.

The Excelsior Medical  
Clinic has recently pub-  
lished a New FREE Book,  
fully illustrated, on how  
neglect of Hernia, Rectal  
and Colon disorders or  
Glandular Inflammation  
often results in painful  
surgery.

Gives knowledge and in-  
formation that could  
prove of utmost impor-  
tance in your future life.  
No obligation.

### Write for Our New Free Book

**EXCELSIOR  
MEDICAL CLINIC**  
Dept. H6250  
Excelsior Springs, Mo

Gentlemen: Kindly send me at once, your  
New FREE Book. I am interested in full  
information on (Please Check Box)

- ☐ Glandular Inflammation ☐ Hernia  
☐ Rectal-Colon

Name.....

Address.....

City..... State.....

### Rectal Colon Glandular Inflammation

These disorders are  
amenable to our MILD  
NON SURGICAL types  
of treatments. They can  
be treated at the same  
time we treat your  
Hernia condition. Full  
details given in our  
FREE Book.





# TRAINED MEN NEEDED!

**IN INDUSTRY—ARMED FORCES  
BIG PAY!—GOOD FUTURE!**

- ☐ DIESEL ☐ ELECTRONICS  
☐ AUTO ☐ AUTOMATION

**NEVER BEFORE** has the opportunity been so good for the properly trained mechanic and technician to step into **BIG PAY POSITIONS** with rapid advancement and future security virtually assured.

**YOUR SUCCESS** depends on the quality of training you receive... and the reputation of the school you attend.

**YOUR GUARANTEE** we are giving the best in mechanical and technical training is proved by the fact... High pay jobs in Industry, and ratings in the Armed Forces now waiting for our graduates.

**RESIDENT SHOP TRAINING** is easier and costs less than you may think! We provide you with housing and part-time jobs while in school, plus free nation-wide placement service for graduates.

Check subject above in which you are interested and mail for

**FREE BOOKLET**

**BAILEY**  
**Technical Schools**

Veteran Approved

1626 S. Grand, Rm. 50, St. Louis 4, Mo.

Name \_\_\_\_\_ Age \_\_\_\_\_  
Street \_\_\_\_\_  
Town \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

## "I Earn Two Incomes Now"

**Says John Bonnie, Pittsburgh, Pennsylvania**

"Thanks to your wonderful training, I have been able to earn \$20 to \$25 extra each and every week doing little locksmith jobs at home—after work at my regular job. This is the best trade a man can take up!"

## Be a LOCKSMITH

Add 50%-100% to **YOUR INCOME** with easy spare time earnings. Cash in on nationwide shortage — trained locksmiths in demand! Quickly step into a big-pay opportunity job — high-profit shop of your own.

**Earn Extra Money RIGHT AWAY! All Special Tools, Supplies Furnished FREE.**

Age, education, minor physical handicaps don't matter in this growing trade. You can quickly qualify as a skilled locksmith. Study at home as little as one hour a week. Gain practical experience through well-illustrated lessons. Do real jobs on car locks, house locks, padlocks and safe locks, under the guidance of experts.

### MAIL COUPON FOR FREE BOOK

For a future as your own boss or in a high-pay job, write now for **FREE** illustrated book! Only school of its kind. Lic. State of N.J., Accredited NHSC. **Locksmithing Institute**, Dept. 207, 150 Park Ave., E. Rutherford, N.J. (Div. Tech. Home Study Schools) **Approved for Veteran Training.**

### MAIL COUPON NOW

**LOCKSMITHING INSTITUTE**, Dept. 207  
150 Park Avenue, E. Rutherford, N.J.

Please send Free Illustrated Book without obligation.

Name \_\_\_\_\_  
(Print here)

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

☐ Check if Veteran



### Free English Assignment

No classes to attend. Easy spare-time training at home covers big choice of subjects. Many complete high school in two years. Friendly instructors; standard texts. Full credit for previous schooling. Diploma awarded. If you have left school and are 17 or over, write for **FREE** catalog!

Accredited Member, National Home Study Council

**Wayne School of LaSalle Extension University**

A Correspondence Institution

419 So. Dearborn, Dept. 758W, Chicago 5, Ill.

## GOVERNMENT OIL LEASES LOW AS \$1 PER ACRE.

You do no drilling, pay no taxes, may realize a king-size profit without ever leaving home. Write for free map and literature.

**AMERICAN OIL SCOUTS, Dept. PS**

8350 Santa Monica Blvd.

Los Angeles 46, Calif.

## Free Book on Arthritis And Rheumatism

### HOW TO AVOID CRIPPLING DEFORMITIES

Explains why drugs and medicine give only temporary relief and fail to remove the causes; tells all about a specialized non-surgical, non-medical treatment which has proven successful since 1919. Write for this 36-page **FREE** BOOK today.

**BALL CLINIC**

Dept. 36

Excelsior Springs, Mo.

## Saving for Security Is Easy

It's actually easy to save money—when you buy United States Series E Savings Bonds through the automatic Payroll Savings Plan where you work!

## Your Dollar Will Feed A Refugee

War and political refugees overseas urgently need the direct help, the personal encouragement, of CARE food packages—\$1 for 22 lbs. of farm staples, **Delivered In Your Name.** Mail your dollars to "Refugee Campaign," CARE... today!



660 First Ave.

New York, N. Y.

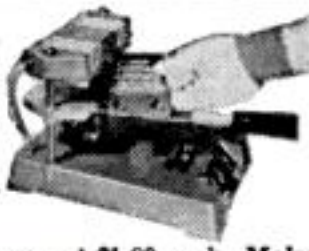
Printed as a public service



## New Table Top Invention Puts You In... **PROFITABLE RUBBER STAMP BUSINESS**

**Home Operators now make  
\$9.20 AN HOUR in busi-  
ness once monopolized by  
a few big companies**

Special rubber stamps bring high prices—cost only pennies to make on new, low-cost table top machine. Take 27 cents worth of material, make perfect stamps, the kind businesses and offices now buy by the dozen at \$1.80 each. Make up to \$9.20 an hour. Start in spare time in your own home. Run machine on kitchen table using ordinary electrical outlet. Make any kind of stamp. We'll send you free information without obligation about this established, highly profitable business, now open to individuals for the first time. For free information send name today on a post card to Rubber Stamp Div., 1512 Jarvis Ave., Dept. R-3-H, Chicago 26, Ill.



## **START YOUR OWN MONEY-MAKING BUSINESS**

Clean rugs on customers' floors—upholstery in their homes—even painted walls—with highly efficient electric machines which are making big money for others and giving them independence. Write today for complete information. It's FREE!

**VON SCHRADER MFG. CO., Dept. 711 "R" PL., Racine Wis.**

## **Aluminum Boat Kits**



**Alumakit® Co., Inc.**

710 Shetland Industrial Park, Salem, Mass.

Assembled in a weekend from factory finished aluminum parts. No riveting, no bending, no guesswork. Save up to 60% of factory built prices. The perfect light car toppers for the sportsman. Models up to 14 feet. Send 10c for new catalog. **\$58 UP** Pat. Pend

## **SIGN PAINTING**

**Home-Study Course—Only \$5.95**

Teaches you commercial sign painting and sign building as it is being done TODAY in leading shops all over the country. Complete practical course for self-instruction. Shows latest methods of truck lettering, office doors, wood letters, reflecting signs, plastics, sprayed signs, gold leaf, silk screen process, up-to-date alphabets, money-making business information, etc. **SATISFACTION GUARANTEED OR REFUND!** Contains all the instruction of a high-priced correspondence course. Full price, only \$5.95, postpaid. Or C.O.D. plus postage. No risk—order today. Satisfaction or money back! Order "Sign Painting Course."

**NELSON-HALL CO., 210 S. Clinton St., Dept. 2GP-1, Chicago 6, Ill.**



## **HI-FI SOUND EFFECTS**

Newest sounds—airplanes—DC8—Electra prop-jet—Boeing 707—Air Force F-104 Starfighter—Regulus I—missile launching—carrier sounds—also autos—music—trains—household—industry. More than 13 classifications; over 1500 real-life sound effects. See your dealer or send 25¢ for 2 catalogs containing more than 250 record listings. **MP-TV SERVICES, 7000-H Santa Monica Blvd., Hollywood, Calif.**

## **TELEPHONE**



## **HANDSETS**

Use as inter-house phone, talk house to garage, as loud speaker system, etc. You receive transmitter, receiver, 3 conductor cord and simplified, illustrated installation diagrams. Handsets are guaranteed to be the same as used in our great National Telephone System. Price delivered \$2.95. Two for \$5.00!

**TELEPHONE REPAIR AND SUPPLY CO.**

Dept. PS-605

1760 Lunt Ave., Chicago 26

## **MAKE MONEY FOR YOURSELF**

**as a Contract Truckman  
pulling a Mayflower Van**

- ▶ *Begin* a profitable business in partnership with Aero Mayflower Transit Company, Inc.
- ▶ *Learn* the moving business from experts, with on-the-job paid training.
- ▶ *Earn* big commissions. We do all the selling.

(CUT THIS COUPON AND MAIL TO):

**Mr. D. C. Swanner  
Aero Mayflower Transit Co., Inc.  
P. O. Box #107,  
Indianapolis 6, Indiana**

I own a new or late model tractor and am ready to come to Indianapolis to get started. (Check here) ☐

I am financially able to arrange for a down payment on a tractor in my own home town and would like a personal interview in my area. (Check here) ☐

Please send me complete details without obligation. (Check here) ☐

I am over 22 and can pass ICC physical fitness test (Check here) ☐

Name .....

Address .....

City ..... State .....



**handiest glue  
around the house**

Speedy squeeze bottle. No muss, no fuss. Dries fast, clear and strong! From furniture to scrap-books, best all-purpose glue you can buy. Send stamped, self-addressed envelope for Free copy of "Elmer's Guide to Good Gluing". Write The Borden Company, Dept. PS-70, 350 Madison Avenue, New York 17, N. Y.

**BORDEN'S PRODUCTS FOR THE HOME HANDYMAN**



that Reader Christman's Falcon probably needed was to have the timing set right after the car was broken in. The bigger jets are costing him gas mileage.

### New Days, New Ideas

WE ALL use our plain, ordinary mirrors with satisfaction. In view of this, can you explain why David Ugent, photographer ["Picture News," March p.



125], must use closed-circuit TV so a sitter can "pick a pose"?

BARBARA CHAIM, Denver.

Possibly so his sitters can see exactly how they will look in their pictures—not in reverse image as seen in a mirror.

### It's Cold Out There

I'D LIKE to know if very cold temperature will lower the amount of uranium needed to make an atomic reaction take place? To put it another way, will cold speed up an atomic reaction?

Also: Can the speed of light be slowed by intense cold? Naturally, the light would have to be traveling through some very cold gas.

Just why is it that men would suffer intense cold in space? With nothing to absorb the heat given off, it does not seem to be right. Perhaps I am missing a simple point here.

J. W. LEGLER, Hanover, N. H.

All available evidence indicates that cold has no influence upon the speed of an atomic reaction or upon the velocity of light.

The human body normally loses heat to its surroundings in three ways: 1) by evaporation of perspiration at skin surface; 2) by conduction from skin to surrounding air; and 3) by radiation from the skin in the form of radiant heat. This infrared (electromagnetic) radiation occurs regardless of whether the body is

surrounded by air or by empty space.

### Comet Vs. Falcon

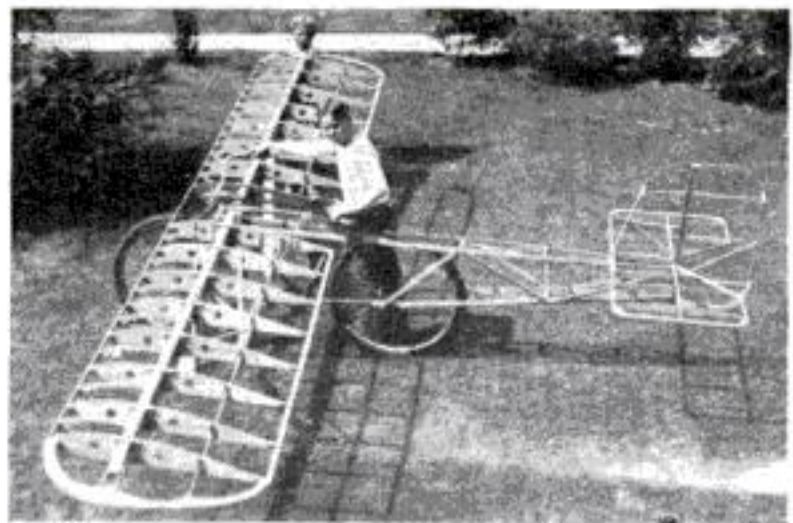
How do you explain the Comet's top speed of 90 m.p.h. ["Ford's Not-Quite-So-Compact Car," March] as compared with the Falcon's 78? The Comet is larger and heavier but uses the same 90-horse six. My Falcon registers 95. Allowing for a five-mile error, this is still 90.

GLENN McDUFFIE, Tuscaloosa, Ala.

Auto Editor Ken Fermoye comments: "Cars differ. As for the Comet, the one I drove was a finely tuned engineering test car wrung out under controlled conditions at Ford's Arizona proving ground. If the Comet is, indeed, faster than the Falcon, I suspect that its axle ratio (3.56 as against 3.1) actually contributes to, instead of inhibits, its top speed."

### Pedaling into Space

AFTER reading about the leg-powered flycycle ["Picture News," April], I hunted up this 1927 snapshot of another hope-



ful "flybike." I built this one for my son. It had an operable rudder.

The idea was to pedal fast down a slope and take off, then balance with the body in lieu of ailerons. It stayed on the ground—but the kids sure got exercise.

HI SIBLEY, Nuevo, Calif.

### No Spilled Milk

PLEASE tell the fellow who wants a cap to make it easier to pour from a milk bottle ["I'd Like to See Them Make," April] that we make a rubber cap with a pouring spout. He can get one to fit a quart bottle or a gallon jug of milk.

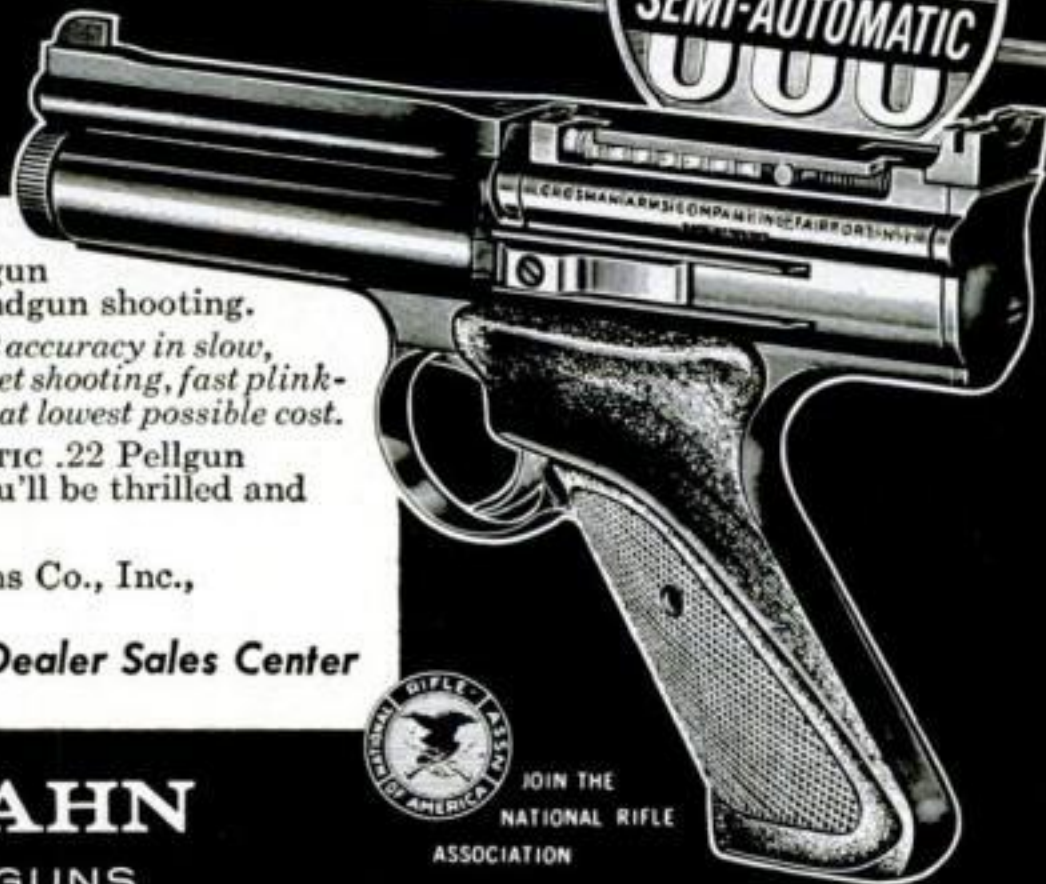
W. H. TREXLER JR.

Trexler Rubber Co., Ravenna, Ohio.



# 10 SHOTS IN LESS THAN 3 SECONDS!

AS FAST AS YOU CAN PULL THE TRIGGER  
 X X X X X X X X X X



Another "world's first" by Crosman!  
 A major breakthrough in CO<sub>2</sub> gas powered gun engineering... opens a whole new era in handgun shooting.  
 Now, for the first time you can enjoy match target accuracy in slow, timed, and rapid-fire competitive or practice target shooting, fast plinking, fun shooting... anywhere... anytime... at lowest possible cost.  
 The revolutionary new "600" SEMI-AUTOMATIC .22 Pellgun Pistol is truly a superb precision handgun you'll be thrilled and proud to shoot.



Write for literature: Crosman Arms Co., Inc.,  
 Dept. PS-43, Fairport, N. Y.  
**See it at your Crosman Select Dealer Sales Center**

**Crosman** CO<sub>2</sub> GAS **HAHN**  
 PELLGUNS BB GUNS



JOIN THE  
 NATIONAL RIFLE  
 ASSOCIATION

WORLD'S LARGEST MANUFACTURERS OF CO<sub>2</sub> GAS-POWERED RIFLES AND PISTOLS

## HERE'S A MONEYMAKER FOR YOU!

**make from \$3 to \$6 an hour  
with the FOLEY SAW FILER**

Ask yourself these three questions: 1. Do I really want to get ahead *faster*? 2. How can I do it? 3. Am I willing to *use* my spare time? If you answer "Yes" to questions 1 and 3—then we have a positive answer for you on No. 2. Men make from \$3 to \$6 an hour sharpening hand, band and circular saws with Foley Saw Filers. No experience needed, to turn out sharp, smooth-cutting saws with this automatic machine. Start in spare time—no canvassing.

### HERE'S THE WAY TO START

Read "Money Making Facts"—shows you how others have added hundreds or thousands of dollars to their incomes in this steady, repeat, CASH business. Start your *own* business in your basement or garage, no overhead, small investment. With *Time Payment Plan* the Foley can more than pay for itself out of profits. Send for "Money Making Facts"—mail coupon now. No salesman will call.

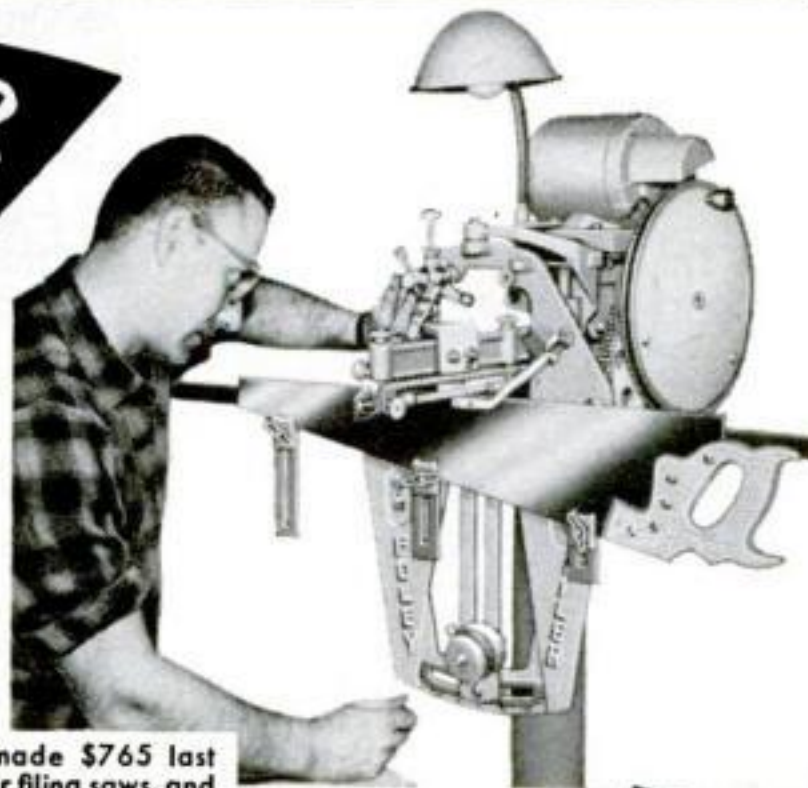
### HERE'S PROOF

"When Mr. Patrick got his Foley Saw Filer in March 1946 he made a good and wonderful investment. He has done so well that we bought a house and paid for it; bought a new car, built an addition to our house. Nicest of all, it's all paid for." Mrs. Leslie Patrick.

"I made \$765 last year filing saws, and it sure comes in handy. I do this work in my spare time." —James B. Williams

"Last year's profit amounted to \$3,000. Not so bad for a one-man outfit." —Charles C. Hough.

"I have done 4 or 5 thousand saws in my spare time in the 4½ years since I got the outfit, and they are all coming back with repeat orders." —Len Crego.



FOLEY MFG. CO., 719-0 Foley Bldg., Minneapolis 18, Minn.

Send me free book "MONEY MAKING FACTS" and Time Payment Plan.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

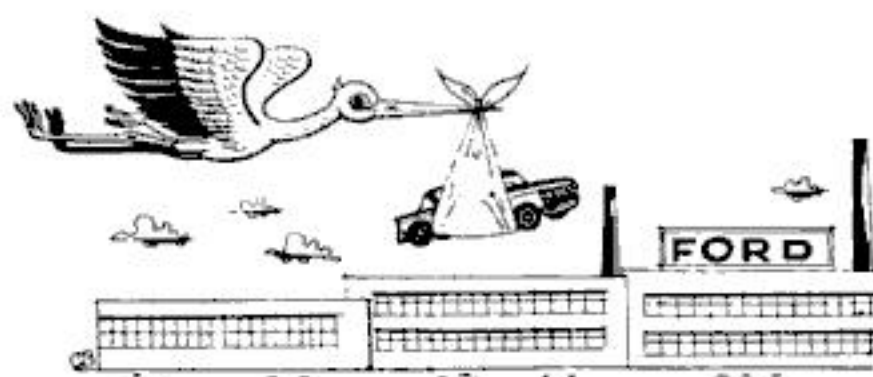


## Splitting Engine and Transmission

**R**UMORS of a unique drive train for the compact Pontiac are correct. Engineers plan to divorce the engine and transmission of the new compact (it will be called Tempest, and unveiled in October). There'll be a bell housing up front, bolted to the engine, but inside it there'll only be a flywheel.

In the rear will be a "transaxle"—a

combination of fluid coupling and planetary gearbox on automatic jobs, or gearbox and clutch on manual-shift cars. In place of the conventional tubular shaft there'll be a small, solid, torsion-bar-like shaft to transmit power from front to rear. The floor tunnel will be smaller as a result, and also the hump on the front of the toe board.



**Baby Falcon "go-ahead."** Circling the roads of Ford's proving grounds are disguised prototypes of a small car slated to compete directly with economy imports like the VW and Renault. The baby Fords won't be ready this fall when other 1961 models appear, but you can look for them to hit the showrooms shortly after next January 1.

The prototypes look like Saabs and Anglias, but Dearborn-designed chassis hide under those camouflage bodies. All use liquid-cooled, cast-iron engines displacing about 90 cubic inches—mounted

up front and driving the front wheels.

The engines differ in design; in-line and opposed fours and V-4s have been tried. Two narrow-angle V-4s, one with a 20-degree V and the other with a wider 30-degree V, intrigue engineers particularly. They like their compactness. The V-4s are shorter than in-line fours, and—due to their narrow angles and staggered cylinders—not much wider. This compactness would help in designing a comfortable four-passenger car with a 96-inch wheelbase and curb weight of 1,650 lb.—the figures Ford hopes to hit. (By comparison, the VW's wheelbase is 94.5 inches and its weight 1,620 lb.)

Styling rumors say that when the little Ford sheds its Saab false whiskers it will look like a relative of the Falcon, with a dash of the English Ford thrown in for good measure. Kind of an Americanized Anglia.

**Watch those oil drips.** Valiant service engineers warn that care should be taken to prevent oil from dripping on the Valiant's steering idler-arm bushing when changing the oil filter. The bushing is made of natural rubber, which oil deteriorates rapidly—and the bushing's location makes it very vulnerable. It's located

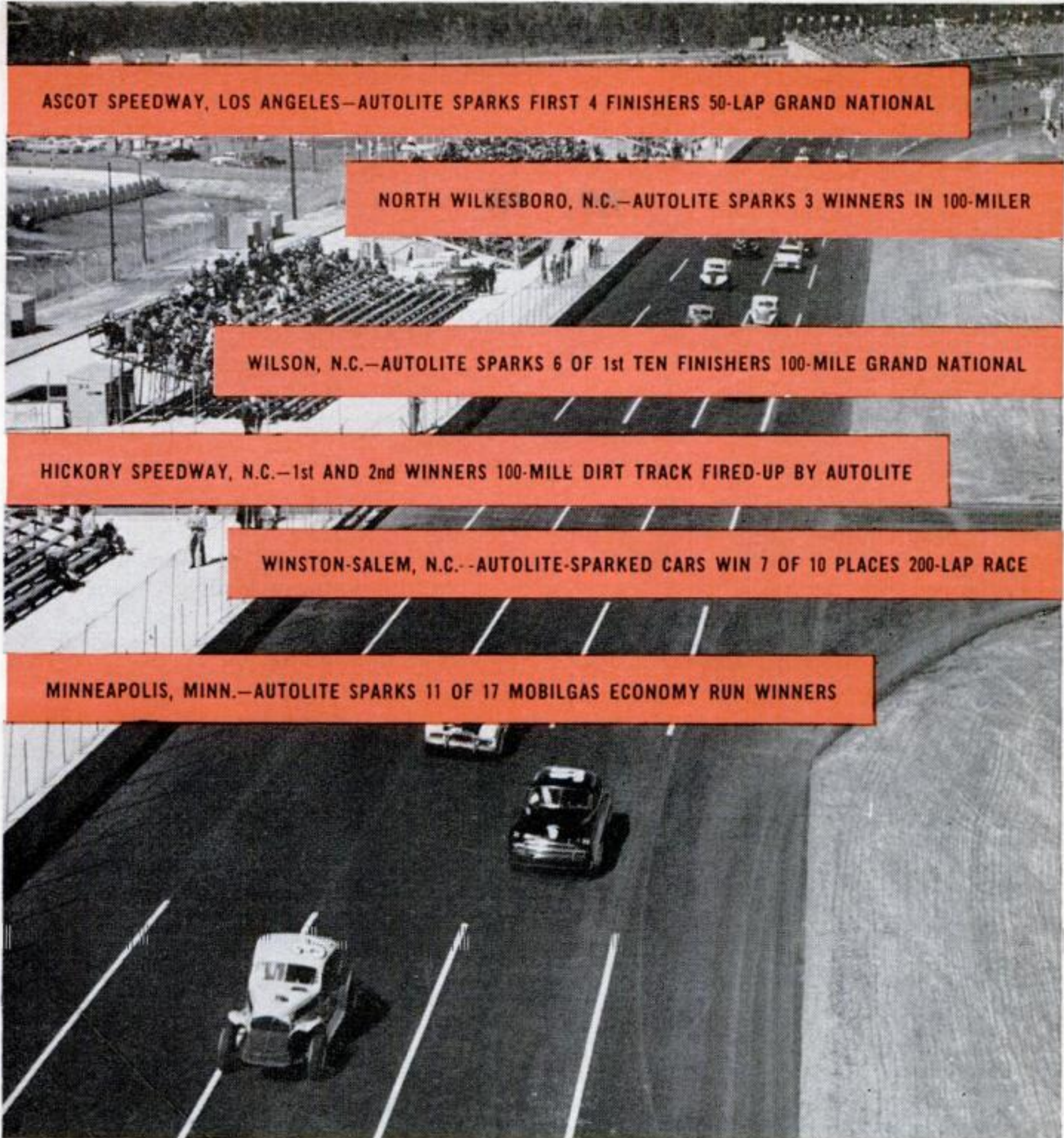
directly below the filter, and, due to the angle of the oil-pump mounting, a small amount of oil flows from the pump body when the filter is removed.

Service experts advise wrapping a cloth around the pump to prevent leakage when the filter is removed. If oil does spill, wipe it off the bushing immediately.

**Driving the four-speed Corvair.** If you like to shift for yourself, besides enjoying a touch of sportiness in your car, try to find one of Chevy's mildly souped

Corvairs with a four-speed, stick-shift transmission. It's a delight. An extra 15 horses (total: 95) give the little compact noticeably more go; getting from zero to





ASCOT SPEEDWAY, LOS ANGELES—AUTOLITE SPARKS FIRST 4 FINISHERS 50-LAP GRAND NATIONAL

NORTH WILKESBORO, N.C.—AUTOLITE SPARKS 3 WINNERS IN 100-MILER

WILSON, N.C.—AUTOLITE SPARKS 6 OF 1st TEN FINISHERS 100-MILE GRAND NATIONAL

HICKORY SPEEDWAY, N.C.—1st AND 2nd WINNERS 100-MILE DIRT TRACK FIRED-UP BY AUTOLITE

WINSTON-SALEM, N.C.—AUTOLITE-SPARKED CARS WIN 7 OF 10 PLACES 200-LAP RACE

MINNEAPOLIS, MINN.—AUTOLITE SPARKS 11 OF 17 MOBILGAS ECONOMY RUN WINNERS

## In the winner's circle from coast to coast

Yes, Autolite Spark Plug equipped cars everywhere are scoring! They're proving the difference ignition engineering makes in performance and economy. Whatever car you drive, you can enjoy the outstanding performance of Autolite Spark Plugs, too! See your dealer and ask for . . .

 **AUTOLITE. SPARK PLUGS**

IGNITION ENGINEERED FOR ALL CARS

Now! Autolite sponsors the election news with Dave Garroway on NBC-TV TODAY Show—and "News on the Hour," NBC Radio.





60 m.p.h. takes just 12 seconds, 5 less than the PS test Corvair checked last fall. Passing time, from 40 to 60, takes less than 10 seconds, compared with about 13 for standard 80-hp. Corvairs.

The modified engine has a hotter cam, heavier valve springs, slightly bigger carburetors, and a larger-diameter tail pipe. It idles a bit faster and is a shade noisier than the standard engine, but isn't hopped up enough to hurt its low-speed docility in traffic.

The transmission, synchronized in the three lower gears, is a dandy. (Leaving

fourth gear nonsynchromo—instead of first, commonly the nonsynchromo gear in four-speed boxes—makes sense. It's harder to downshift smoothly into first with no synchromesh help than it is to slip easily into fourth.) The floor-mounted shift lever slices from gear to gear without hesitation, binding, or crunching. Lever-throw distance is comfortably short. Only unfortunate thing about either the gearbox or optional engine is that both are in short supply—and likely will stay that way until after the 1961 Corvairs make an appearance.

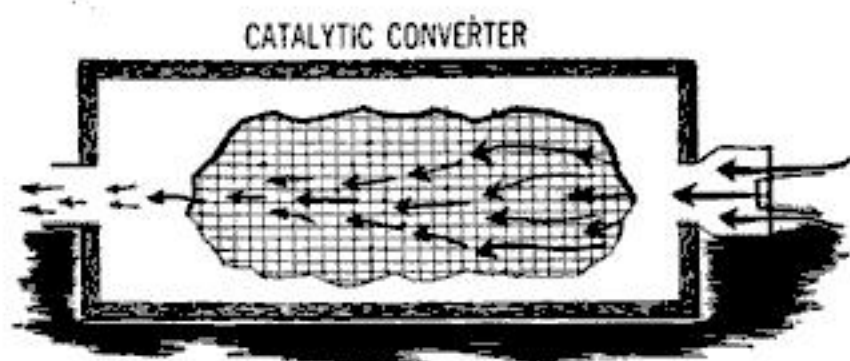
**Corvair wagon coming.** The compact Chevy station wagon due to hit showrooms this fall when the 1961 Corvairs appear will be built like a brick—literally. Shaped like a box with rounded corners, the Corvair wagon reminds those who have seen it of the VW Microbus. It's roomy for its size, and functional, but

not flossy or highly styled like current U. S. station wagons.

Designers specified a drop-down tailgate, but the platform loading height is rather high due to the Corvair's rear-engine, rear-drive arrangement—which dictated the unorthodox shape of the upcoming wagon.

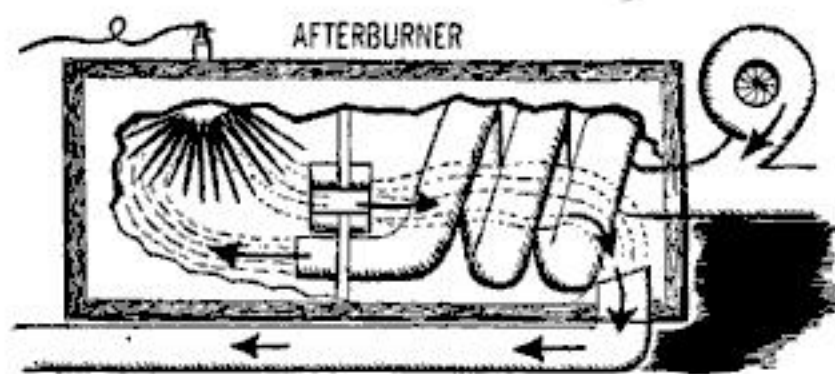
**More power for T-Bird.** Along with a complete restyling for 1961, Ford's Thunderbird will offer a bigger, more powerful standard V-8 engine—390 cu. in., more than 350 hp. (Whether this means the big 430-cu.-in. Lincoln V-8, currently an option, will be dropped for T-Birds is uncertain.) More important,

better braking will result from a switch to one-piece aluminum wheels and brake drums. Cast as a unit with iron facings on the brake surface, the new wheels will reduce fade during severe braking. Kelsey-Hayes is expected to make the wheels for Ford. They may be used by Lincoln, too.



**Anti-smog cars for California.** One year after the state approves two or more exhaust-purifying devices, all cars—new and used—sold in smog-ridden California will have to be so equipped.

What types of anti-smog devices are likely to be approved first? Catalytic converters and afterburners are the top candidates. Converters mix air with exhaust, filter it through chemicals that change hydrocarbons to harmless carbon



dioxide and water. Afterburners ignite exhaust gases and unburned fuel to complete combustion, eliminate carbon monoxide.

Catalytic converters should be cheaper initially, but replacing the chemicals every 15,000 miles or so might cost \$30 or \$40. Afterburners cost more at first. They must withstand temperatures up to 1,700 or 2,000 degrees Fahrenheit, which requires expensive materials. But, properly built, they should last the life of the car.



TRIPLE EXPOSURE at  $f/11$  is how our Speed Graphic caught this fellow flexing his muscles. Just try this exercise yourself. See how fast you tire out. When you do, remember that tires do 700 "push-ups" per mile as they roll along under your car.



## Too much flexing wears out people...and ordinary tires! But not THE TIRE THAT DOESN'T GET TIRED

New *Low Profile*\* tire is actually made lower and wider so it flexes less, lasts longer.

Excessive flexing is what wears out, burns out tires, weakens rubber and fabric, increases blow-out danger. And ordinary tires do flex excessively.

But U. S. Royal has pioneered a new "Low Profile" shape tire that *flexes less, runs cooler, lasts longer*. It offers new protection against high-speed failure and heat blowouts.

Other tire designs don't give such thorough protection. Yet "Low Profile" tires cost no more than ordinary tires. So don't run the risk of tire failure. See the *complete* line of U. S. Royal "Low Profile" tires—now in 5 price ranges for every make and model car—at your U. S. Royal Dealer.



Same air pressure...but look at the difference

Excessive flexing pushes the temperature of ordinary tires above 240°F. That's the danger mark. But the lower, wider shape of U. S. Royal "Low Profile" tires reduces flex, keeps tires *cooler*, even at top highway speeds.

\*"Low Profile" is United States Rubber Company's trademark for its lower, wider shape tire.



PIONEERED BY U. S. RUBBER AS THE ANSWER TO GREATER TIRE SAFETY AND LONGER WEAR

# U.S. ROYAL *LOW PROFILE*\* TIRES



**United States Rubber**

Rockefeller Center, New York 20, N. Y.



# Get satisfying flavor...so friendly to your taste!

NO FLAT "FILTERED-OUT" FLAVOR!

NO DRY "SMOKED-OUT" TASTE!



Never too strong.  
Never too weak.  
Always just right!

*You can light either end!*

**See how** Pall Mall's famous length of fine, rich-tasting tobacco travels and gentles the smoke—makes it mild—but does not filter out that satisfying flavor!

**HERE'S WHY SMOKE "TRAVELED" THROUGH FINE TOBACCO TASTES BEST**



**1** You get Pall Mall's famous length of the finest tobaccos money can buy.



**2** Pall Mall's famous length travels and gentles the smoke naturally . . .



**3** Travels it over, under, around and through Pall Mall's fine tobaccos . . . and makes it mild!

**OUTSTANDING...and they are MILD!**

© A. T. Co. Product of *The American Tobacco Company* "Tobacco is our middle name"



**Wheel-less vehicles with legs for walking, running, and jumping may be the tanks and jeeps of the future**

**POPULAR  
SCIENCE**  
REG. U. S. PAT. OFF. Monthly



**Now the Army is working on**

# **Tanks That Walk and Jump**

**By Martin Mann**

**M**AN'S greatest invention is the wheel, but this handy device isn't good enough for the U. S. Army. For the astonishing truth is that an Army design group is working on machines that walk, creep, run, and jump.

These strange vehicles have legs and feet like animals, and they *move* like animals. The first model of a machine that walks is now being tested. Others that borrow ideas from horses and grasshoppers have been designed.

The Army wants legged vehicles be-

cause legs are still the fastest way to cross rough country. The humbling fact is that, while airplanes fly faster than birds and ships swim faster than fish, no ground-supported machine yet built can get over broken terrain as fast as a horse, mule, or donkey.

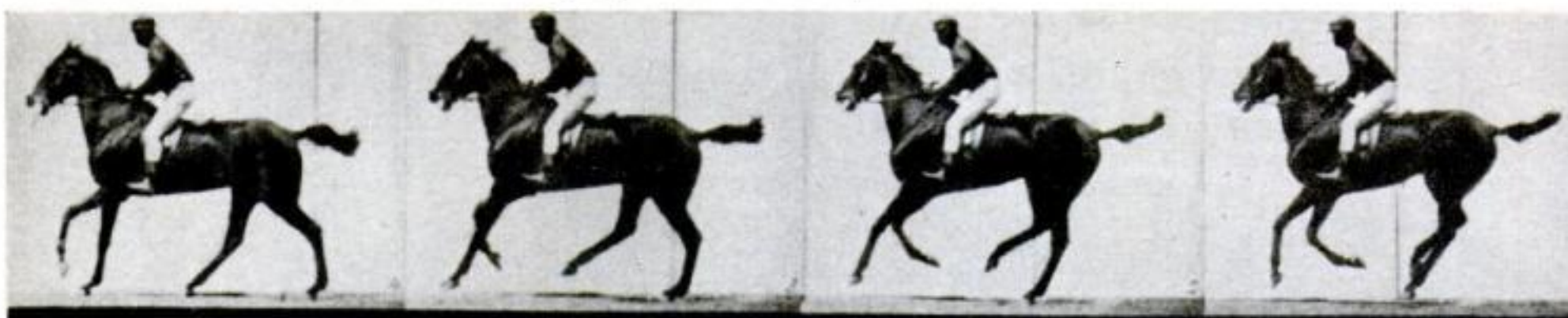
Perfected, such a machine might have revolutionary effects. Sportsmen, geologists, and surveyors might snap it up to get into rugged back country. Farmers might find it easier on their priceless soil than tractors. Miles upon miles of secondary roads, now maintained at great expense, might no longer be needed—

CONTINUED

51



## The horse runs with short, graceful leaps



Masterfully engineered for sustained speed, horse stretches its legs to go fast, folds them with tax savings that are pleasant to dream about.

Military men say there is an urgent need for vehicles that can carry tank-like loads at animal-like speeds. Battles are rarely fought on roads, and great advantages come to the force that isn't tied to a road network. But tanks and jeeps are surprisingly slow once they get off the road. Even on fair terrain the best they can generally do is 10 m.p.h., and 5 m.p.h. is more common. Some rocky land and steep bluffs can't be managed at all.

**Speedy animals.** On a flat track, race horses have hit 38.7 m.p.h. over a mile. Speeds around 30 can be sustained on less-perfect surfaces for some distance. A wild ass has been clocked making an average 30 m.p.h. over 16 miles. An elephant that escaped from a circus camp in the mountains was found 10 hours later 130 miles away.

But more important, legs can go where wheels and track-layers can't. Mountain

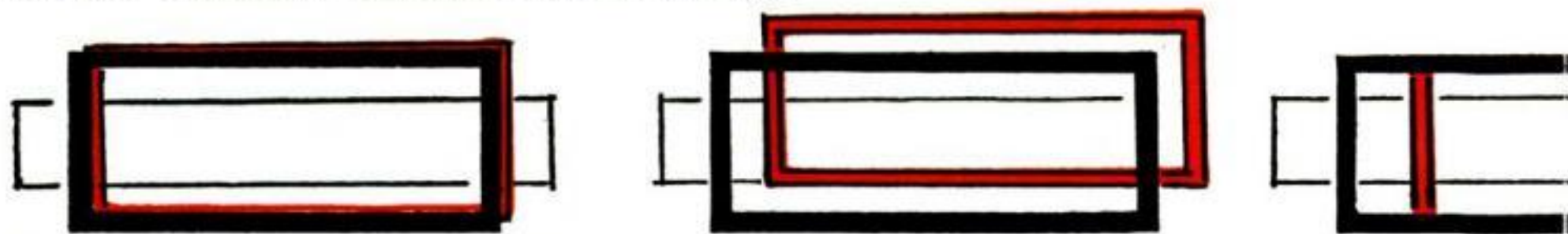
troops all over the world still rely on supply by mules. Kangaroos clear obstacles that would stop a tank.

If nature's designs, perfected over millions of years, are superior, we could be smart to copy them. So the Army hired university researchers to check out legs. There has been no breakthrough yet. But a two-foot-long platform *does* walk, and some of the weirdest mechanical designs ever conceived illustrate official papers.

**Building a horse.** Prof. R. K. Bernhard of Rutgers took on running and jumping. Both motions involve leaping, but running (as a horse does it) is a rhythmic series of leaps, whereas jumping (as a grasshopper does it) is made up of individual, nonrhythmic leaps. Professor Bernhard designed fantastic contraptions to imitate each animal.

The mechanical horse could be jounced along by a motor swinging eccentric weights. This would make the vehicle bounce rhythmically along the ground.

## Army's walking machine plods along



Clumsy gait of model walker is indicated in these diagrams, which follow movement of two

## Jumping machine was to hop like a grasshopper



Levers modeled after animal legs could jump vehicle across the ground. But shocks of





short to lessen inertial force. Photos are from Muybridge's famous series, shot in 1870s.

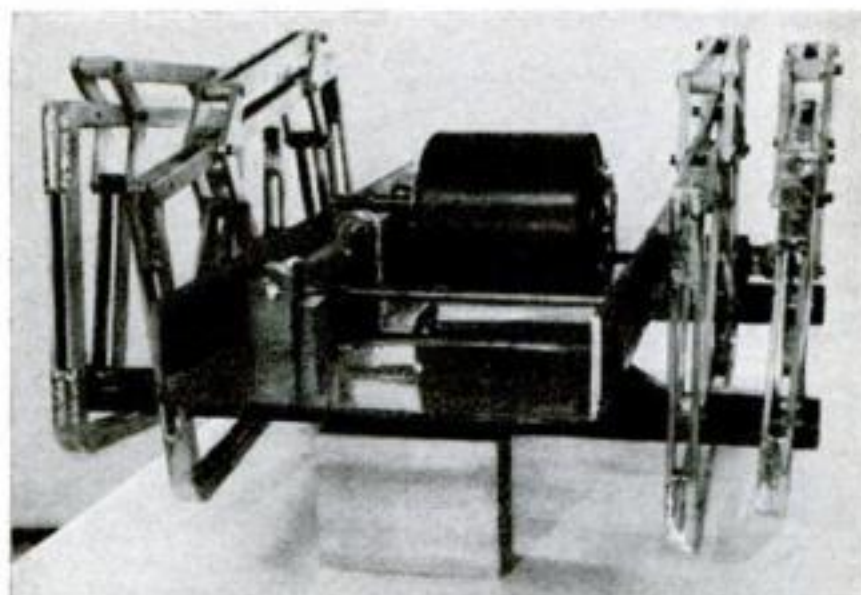
Power unit and crew would ride a softly sprung platform. Unfortunately, the horse machine couldn't hurdle large obstacles. And it couldn't run very fast.

**The grasshopper machine.** Professor Bernhard's proposal for a man-carrying grasshopper was stranger yet. It was to leap by means of a power-operated pogo stick. This would be an adaptation of a commercial machine called a rammer, used to compact soil in construction work. It has a one-cylinder engine with a tamper fastened to the piston rod.

Professor Bernhard planned to equip a frame with rammers set at an angle, their piston rods linked through levers (equivalent to thigh and leg bones) to pronged "feet." When the rammers fired, the levers would extend to propel the machine up and forward, exactly like a grasshopper. The machine would land on big air bags to cushion the shock.

The grasshopper machine could go fast (maybe 30 m.p.h.) and jump obsta-

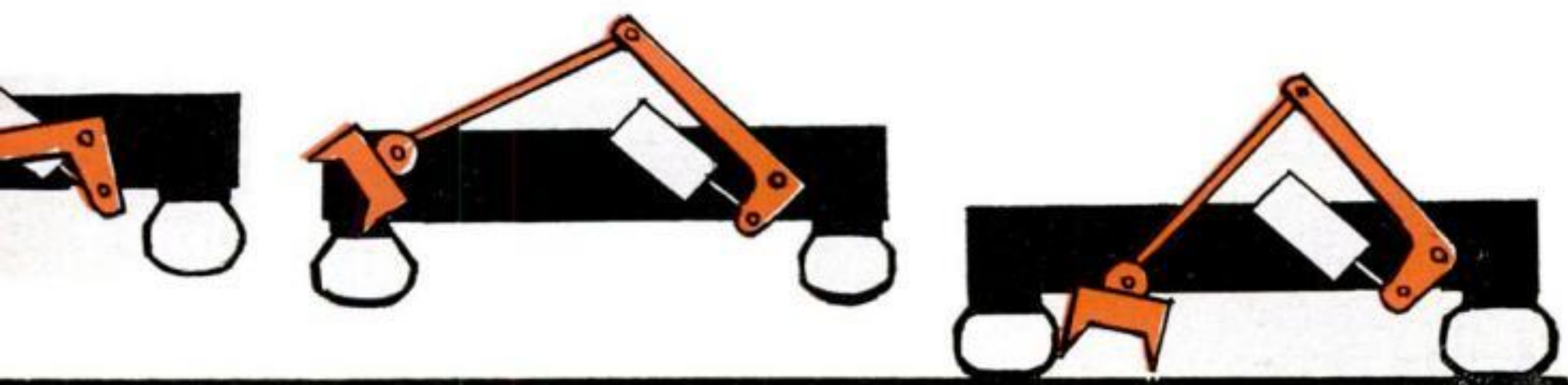
cles. But it couldn't back up easily and might spill if it landed on a rock. More important, the shocks of takeoff and landing threatened to pulverize a crew, and maybe the machine as well. Impact absorption is a major problem; on certain kinds of rough going, a jeep can take



**THIS CONTRAPTION WALKS:** Complicated linkages move the four legs (open metal rectangles) of working model of Army's walking machine. Motor cranks levers through egg-shaped gears.



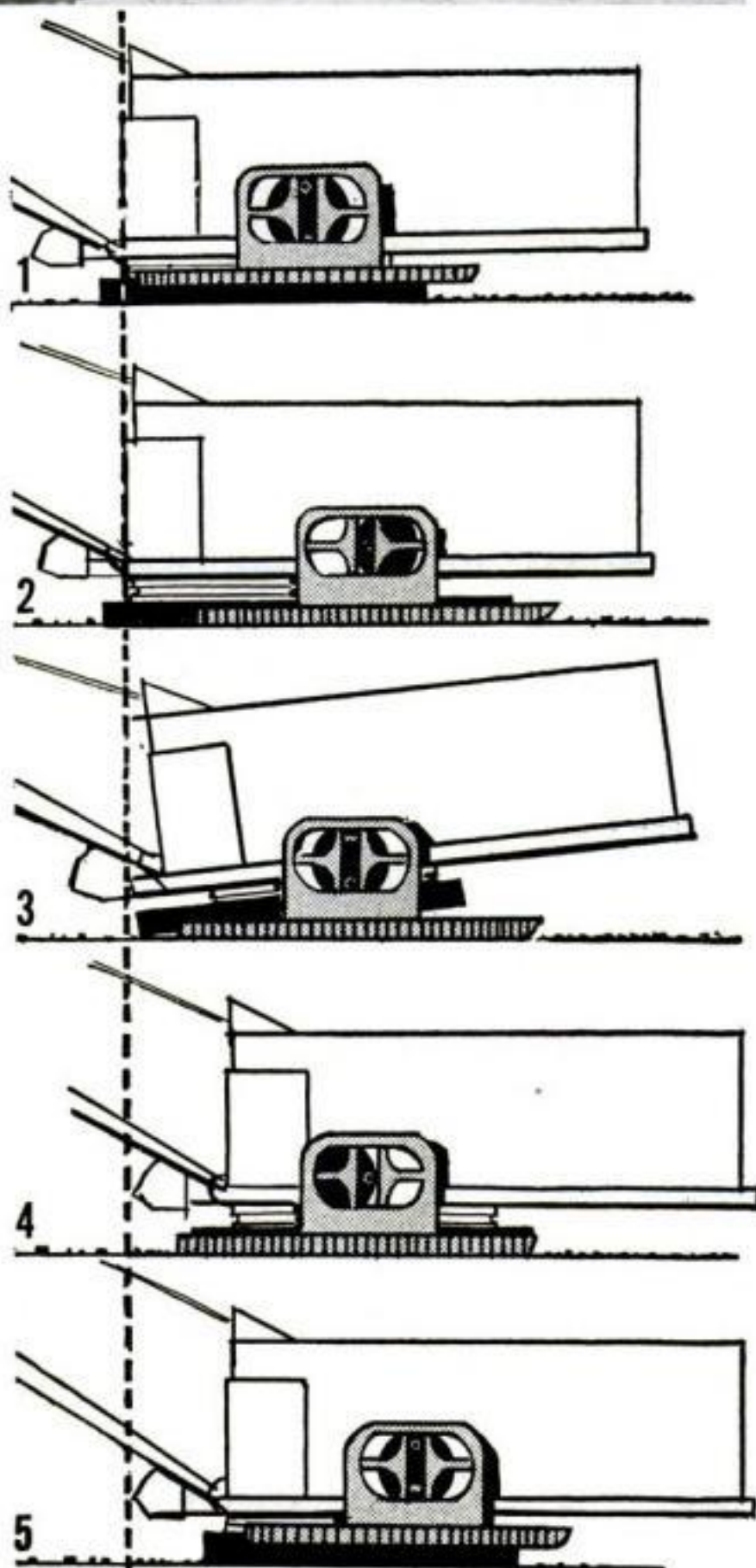
legs on one side of the body. Action is inefficient, but might achieve 20-m.p.h. speed.



takeoff and landing would be too great for a machine large enough to carry men, weapons.



## These leg-propelled machines are already in use



**WALKING DRAGLINE**, Bucyrus-Erie's huge excavating machine, hitches itself across ground on long feet. It goes backwards only (see sketches). At work (1), feet are off ground, dragline resting on central baseplate. Rotating cam moves feet to right and down (2), tilts body (3), slides body to right and down (4), lifts feet again (5). The monster's top speed:  $\frac{1}{3}$  m.p.h.

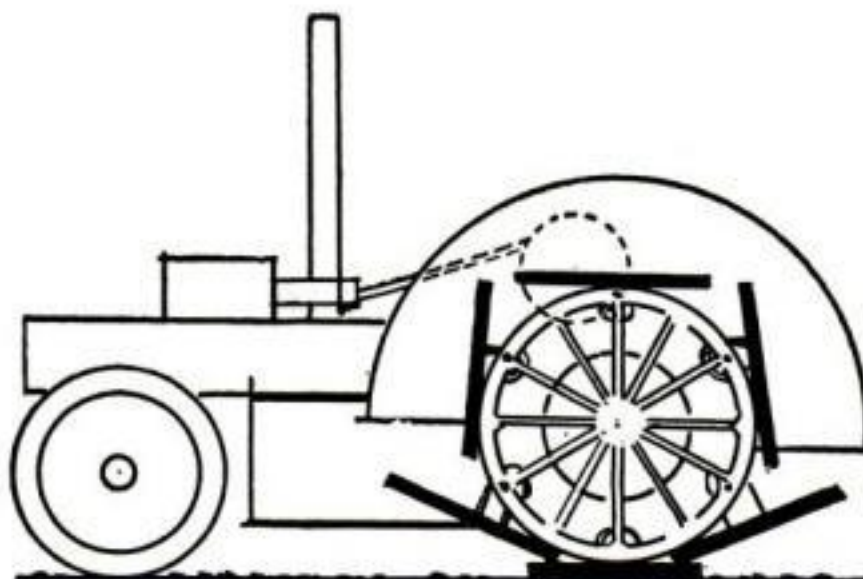


**RAMMER**, Barco's hopping dirt-tamper, has wide foot fixed to piston rod of a one-lung engine. It jumps 14 inches, 60 times per minute. When tilted, it hops along like a pogo stick.

bumps that human passengers cannot.

**A 20-m.p.h. walk.** After Professor Bernhard filed his report (no models were built), the Army pulled in its reins and decided to try walking before running and jumping. This assignment went to the University of Michigan's Prof. Joseph E. Shigley. He hit upon a contraption that looked as if it might walk: a shuttle linkage used for conveyors. He turned this gizmo upside down and drove it through egg-shaped gears cunningly calculated to eliminate sudden accelera-

[Continued on page 216]



**FEET**—hinged to wheels, not to legs—propelled this steam tractor invented by Boydell. It was an excellent cross-country vehicle, widely used until the caterpillar tractor replaced it.



## PS PICTURE NEWS

### Wheeled stadium provides view for two sports

Part of the new baseball-football stadium to be completed next year in Washington, D. C., will roll on wheels.

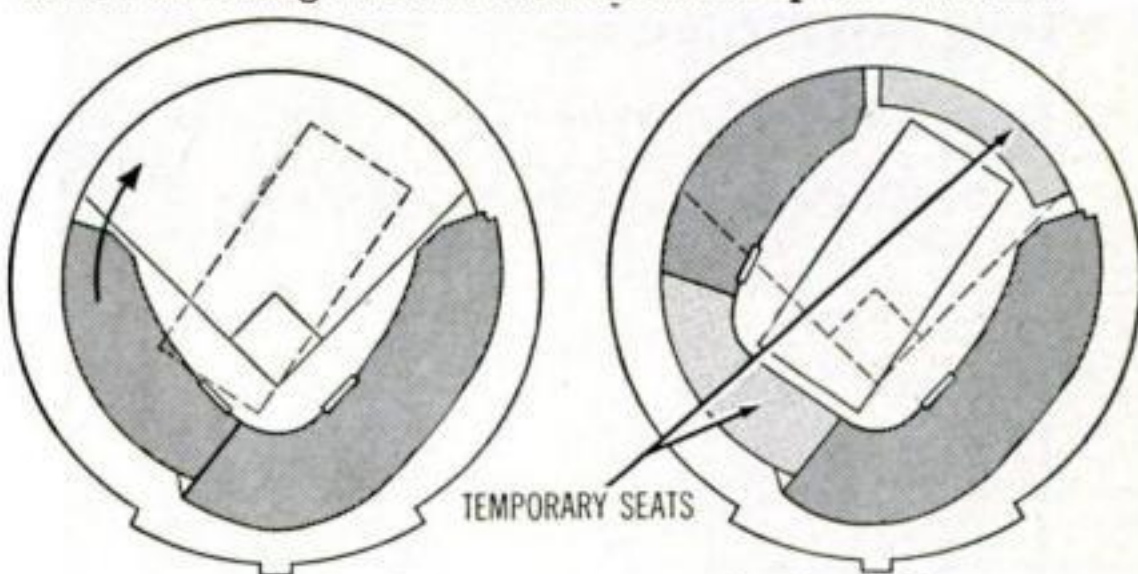
One 400-foot lower grandstand section, including a built-in dugout, will rest on 83 steel wheels 24 inches in diameter. It will reach from the first-base line at home plate to the left-field foul line.

At the close of the baseball season, the section will be pulled by tractors on two tracks—one bolted to the stadium wall, the other buried underground in the outfield. Gaps at the two ends will be filled with temporary seats.

The rolling stadium is being constructed by Osborn Engineering Co., Cleveland, builders of big stadiums: Yankee, Cleveland, Milwaukee, U. of Michigan, among others. It will seat 42,000 fans for the 1961 baseball season, 52,000 Redskin followers that fall.



Model of rolling stadium with seats set up for baseball.



Section rolls clockwise . . . . . for football games.

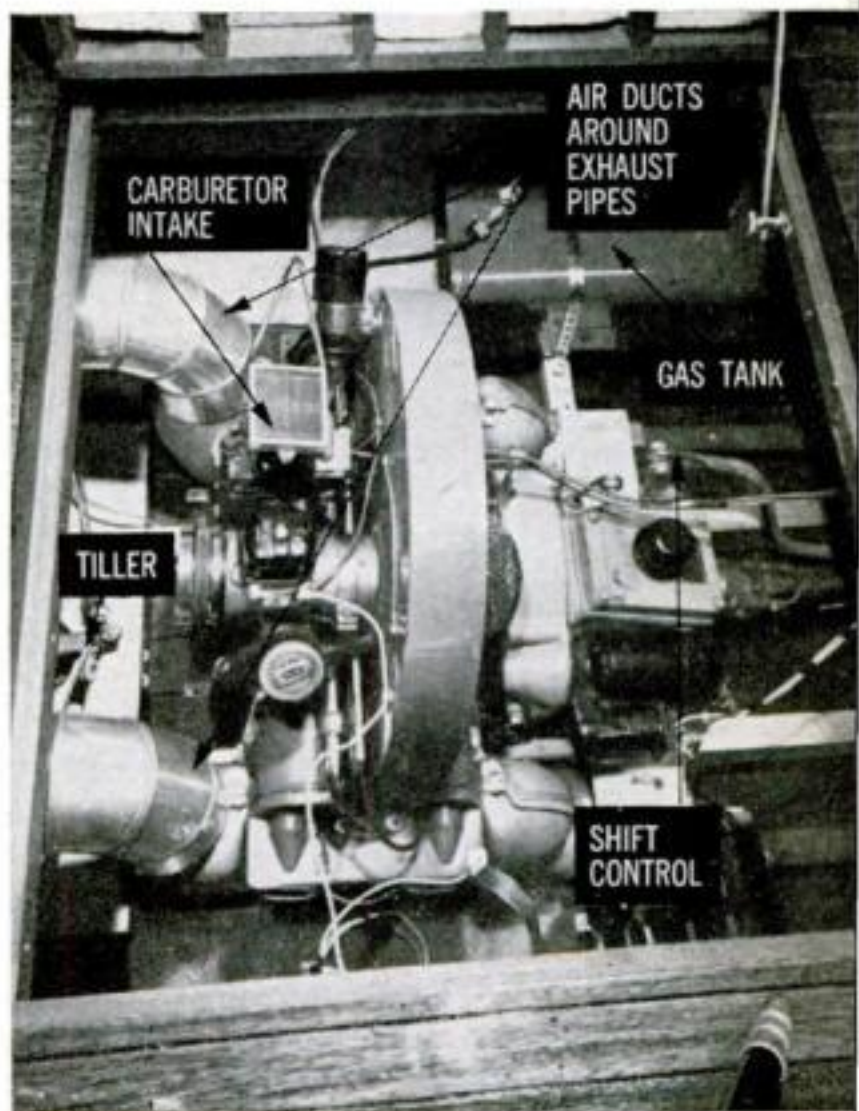
### Runabout uses VW engine



Built especially for the Volkswagen engine, a 17-foot inboard runabout hits speeds up to 25 m.p.h. The Volks-Liner's one-piece hull is made by a German process developed for small planes. It consists of thin birch strips impregnated with a plastic and laminated into five layers.

The 36-hp. VW engine turns the propeller through a Walter's marine V drive with built-in 1.29:1 reduction gear. Air to cool engine, transmission, V drive, and exhausts is drawn into the engine compartment through an opening under the rear seat. It's blown out through the transom in large ducts that encircle the engine exhaust pipes. Fuel consumption is about 1.8 gallons an hour, giving the boat a six-hour cruising range on one tank of gas.

Volkswagen auto dealers will sell the boat for \$2,495 f.o.b. Dundee, N. Y.



Engine turns prop through V drive.





**LID UP**, its mirror lining deflects vertical light beam forward onto the road.

**LIDS LOWERED** (left), car's frog-eye contour is gone, wind drag is lessened.

## Frog-eye conversion

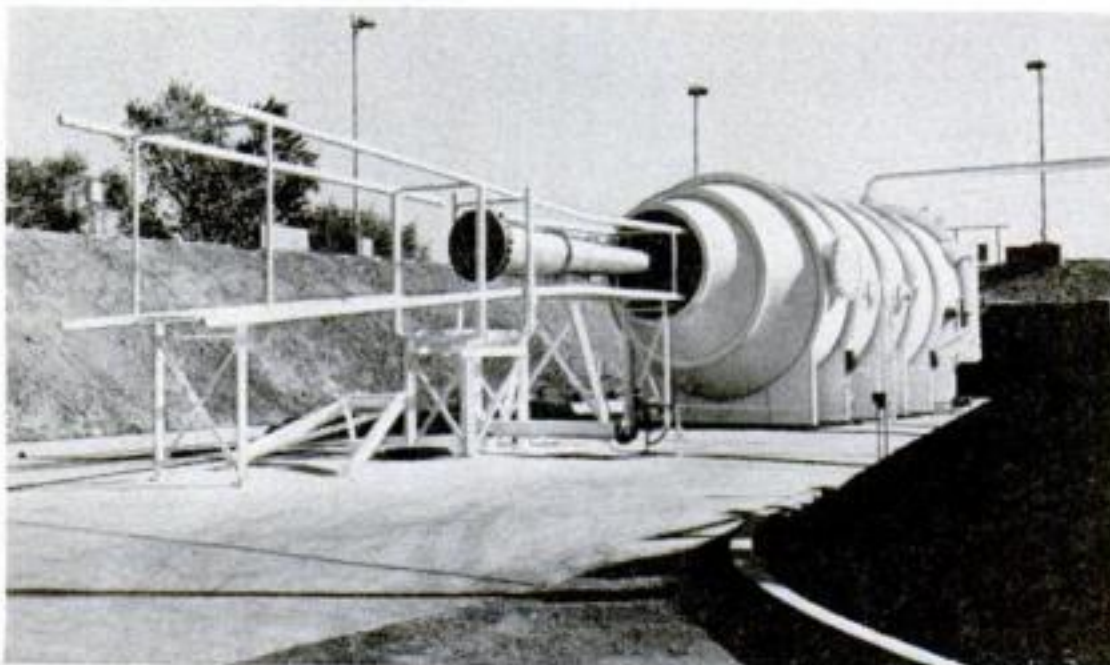
This headlight conversion streamlines the frog-eyed Austin Healey Sprite. It consists of upward-facing lamps recessed in the normal sockets. The vertical beams are deflected horizontally by hinged mir-

rors that are tilted open at night. The lids are moved by a control connected to the light switch. T. E. Killeen, British engineer who made the conversion on his Sprite, contends it cuts daytime wind drag, improves appearance, and keeps the lenses clean longer.

## For high fliers

This odd-looking altitude chamber simulates 100,000-foot heights for testing performance characteristics of solid-fuel ICBM rocket engines.

It was installed by Fluidyne Engineering at Aerojet-General's testing facility near Sacramento, Calif. The tube jutting from the chamber is part of a pressure recovery system. While carrying off hot rocket gases it pumps out air to maintain the low pressure.



## Record-setting outboard

A new world's record for outboards—114.65 m.p.h.—was recently set on an Arizona lake. The photo at left shows the 14-foot prop-walking hydroplane being driven by Hu Entrop of Seattle.

The basic engine was Evinrude V-4 powerhead, coupled to a special geared-up lower unit. Gasoline, not racing alcohol, was the fuel used.



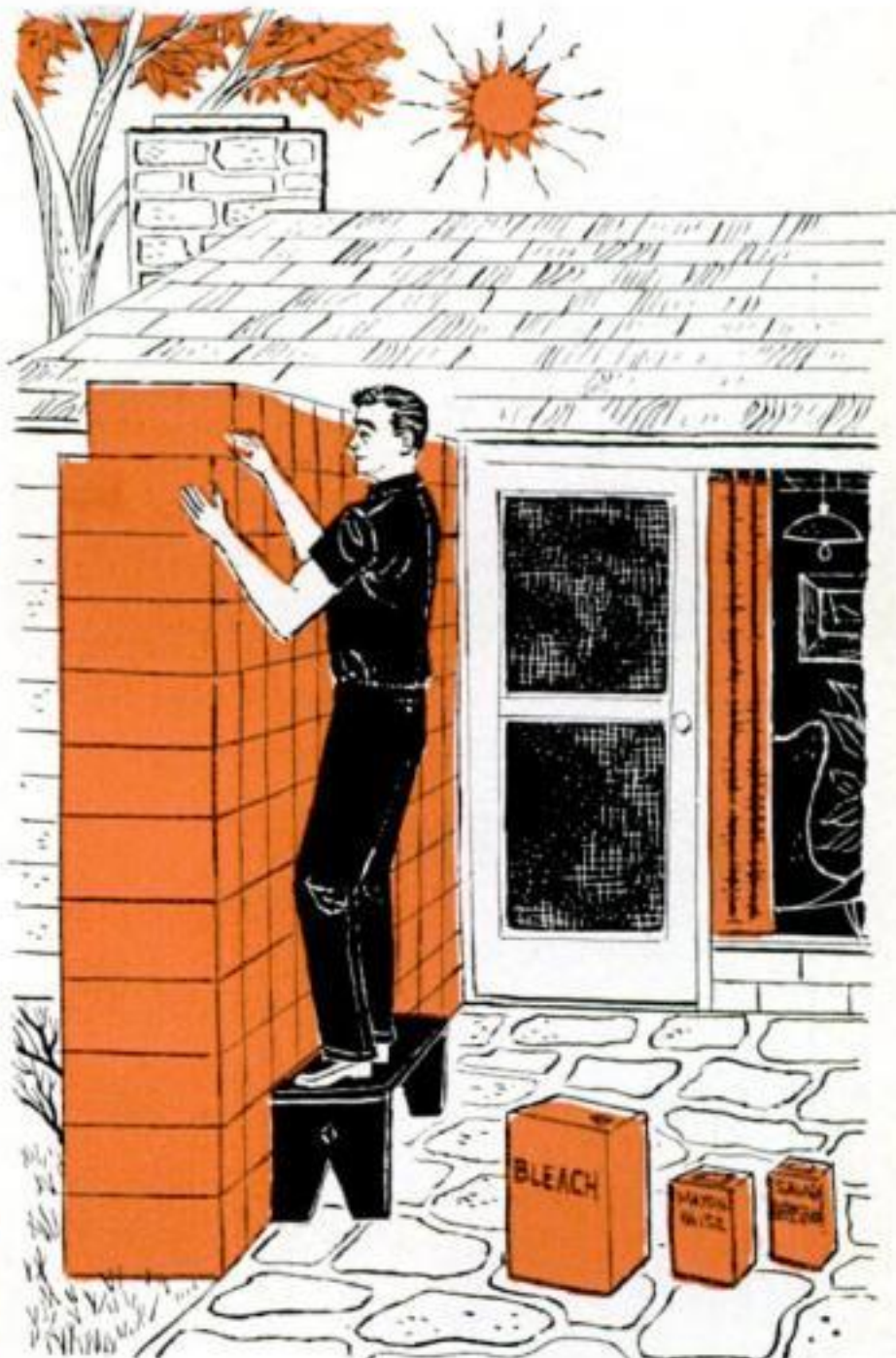
# "I'd like to see them make..."



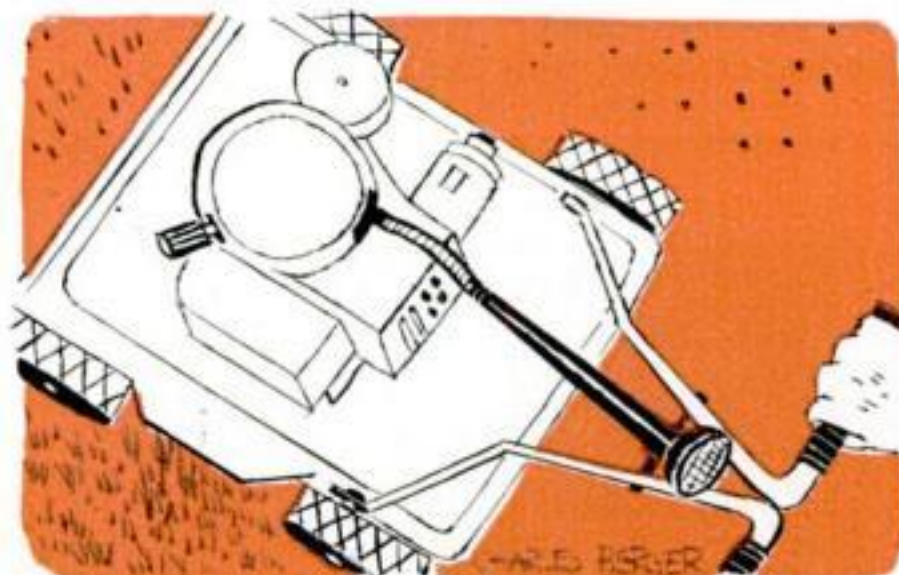
**ROOFTOP SWIMMING POOLS** on garages. Children couldn't stray into them (any exterior stairs would be removable) and they wouldn't rob garden space.—Korlun Nigian, Los Angeles.



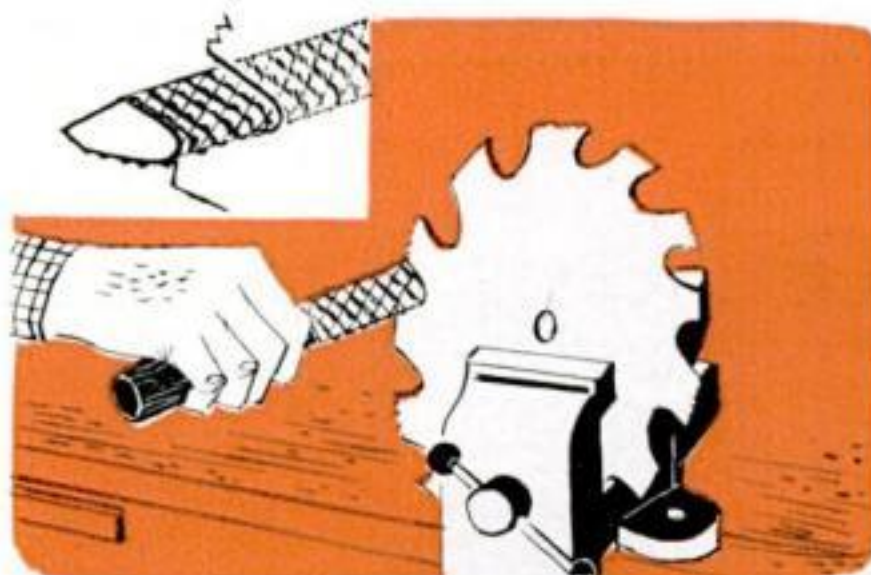
**DISPOSABLE CAR-SEAT COVERS** for riders in beach or work clothes. Of wetproof paper or thin plastic, they'd be sold by vending machines at gas stations.—R. C. Miller, Santa Monica.



**THROW-AWAY BOTTLES AND JARS** with some salvage value. Squared off like milk cartons, they'd stack to form glass-brick room dividers or garden screens.—S. Levine, Oakdale, N. Y.



**ROTARY-MOWER AIR FILTERS** at top of a tubular handle. Placement far from the discharge chute should eliminate clogging and carburetor trouble.—E. Dodd, Middletown, N. J.



**A FILE** shaped like the gullet on a circular-saw blade. That way you could avoid the nicks and notches that spoil the contour after a few sharpenings.—Carl Bombard, Holyoke, Mass.

Everyone has his own pet idea of a gadget that he would like to see in general use. The five ideas illustrated above were suggested by POPULAR SCIENCE readers. What's

yours? We will pay \$5 for each one published. Please use Government postcards only. Write name and address clearly. Contributions cannot be acknowledged or returned.



## NEW FROM EUROPE

# Eight Feet of Space in a Ten-Foot Car

By Harry Walton

**R**ECIPE for packing eight feet of people and luggage into a ten-foot car:

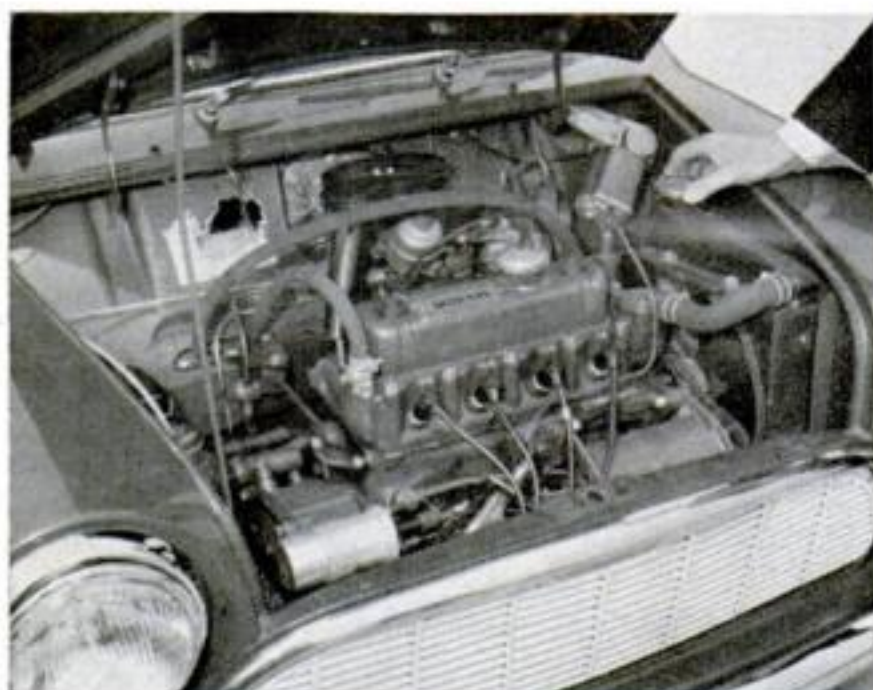
Take a boxy, snub-nosed body. Put small wheels way out at the four corners. Use front-wheel drive and mount the four-cylinder in-line engine crosswise instead of fore and aft.

That's how the British Motor Corporation cooked up the new Austin and Mor-

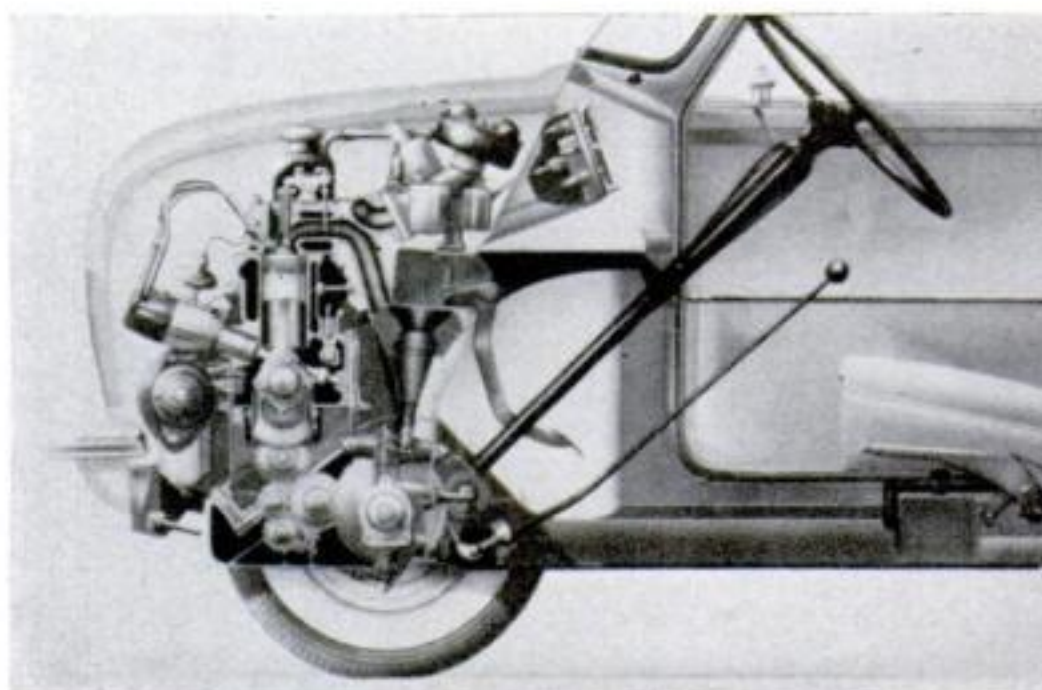
*[Continued on page 217]*



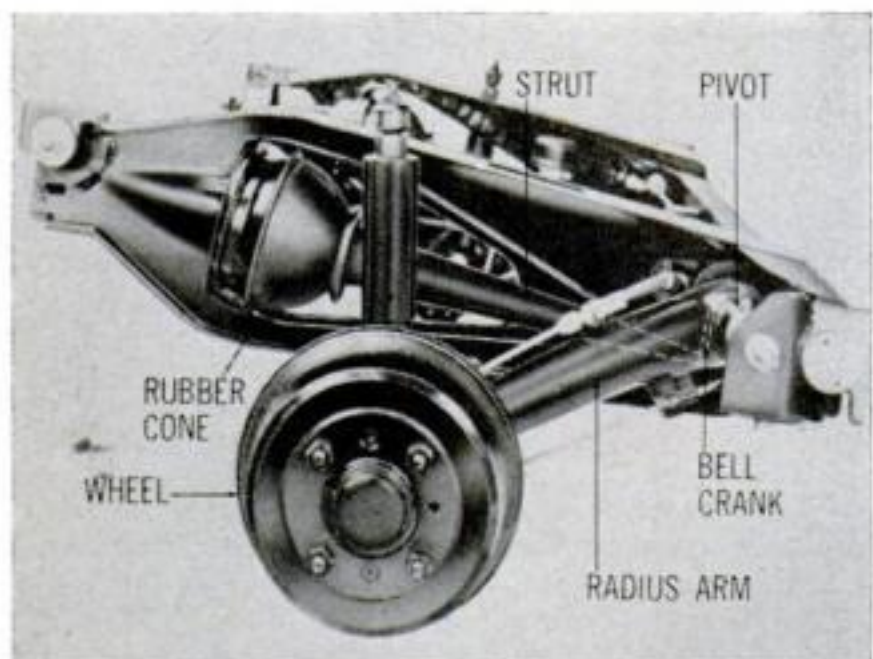
Ten feet short overall, the 850 achieves an



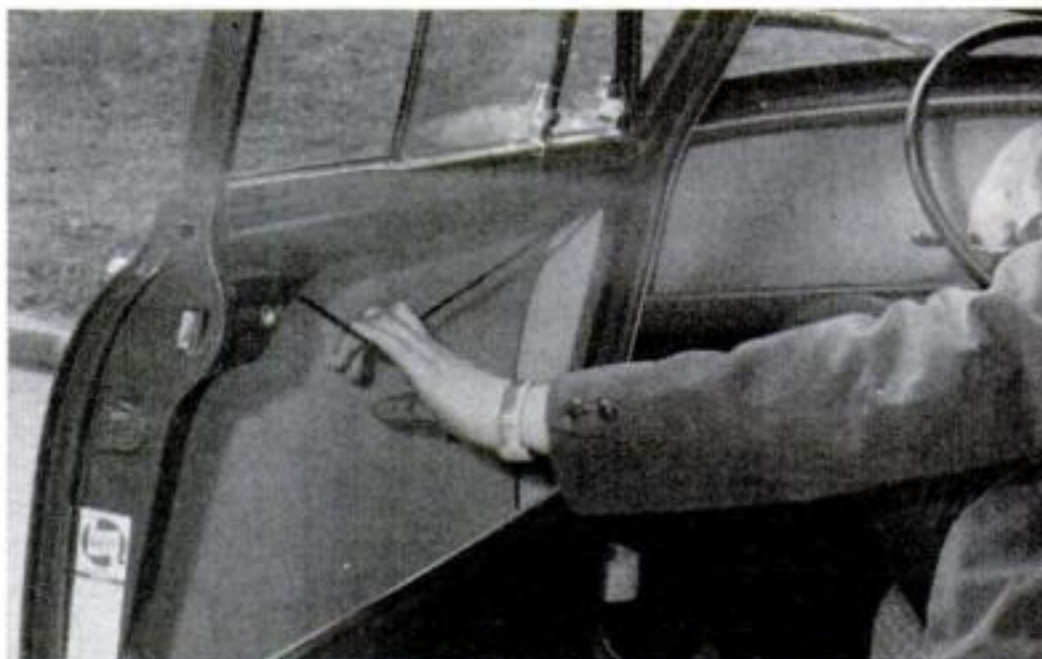
**ENGINE IS RIGHT-ANGLED**, the radiator in one fender. Air entering the grille strikes the engine and is blown through the radiator in reverse. Exhaust gases emerge from a side vent.



**CUTAWAY SHOWS THE TRICK:** The crosswise engine is set forward of the front wheels. Built into its sump directly below the crankcase is the transmission, with the differential right be-



**REAR WHEELS SWING** on radius arms, which have a short leg forming a bell crank. The wheel load is transmitted through this and a strut to the rubber-cone suspension unit.

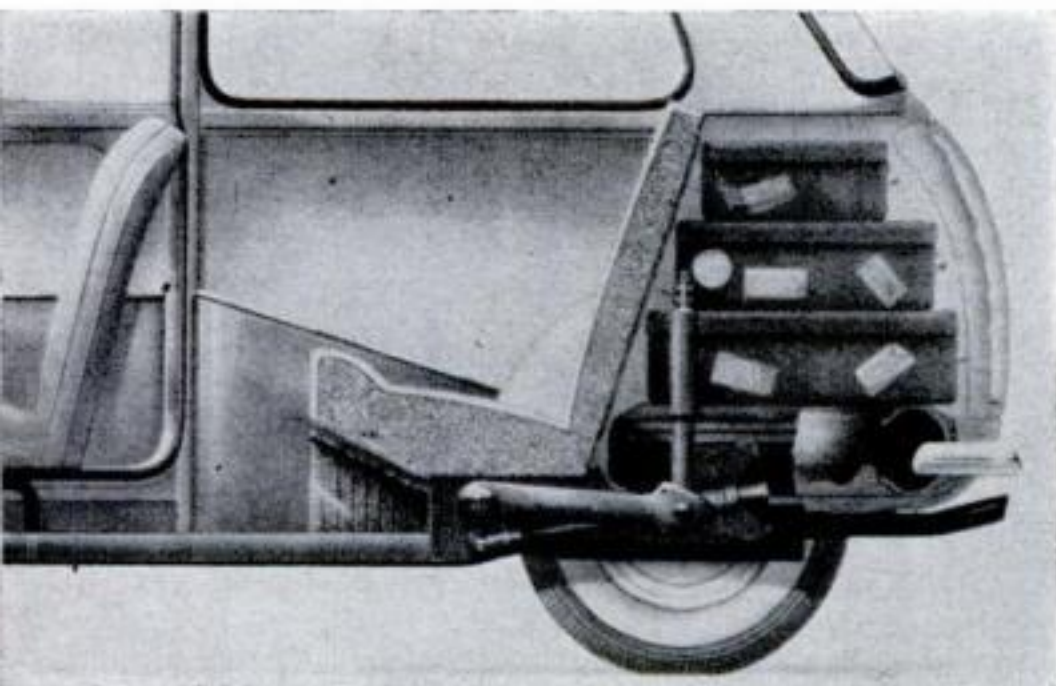


**SLIDING FRONT WINDOWS** leave doors free for deep full-width pockets. Instead of a door handle, a cord releases the latch. Missing is a firm handhold to grab on turns.





amazing eight feet of interior load space. The little car will sell here for about \$1,300.



hind it. There is no separate frame. The drive unit is mounted on the front of the body shell, and a rectangular frame with the trailing wheels is mounted on the rear.



**WHEELS SO LIGHT** you can hold one by a finger make tire-changing almost fun. A single jack socket on each side raises both wheels. The 5.20-by-10-inch tires are tubeless.



**FOOT SPACE AND HEADROOM** are good. The instrument panel, switches, shift stick, and hand brake are all center mounted. Steering is a fast  $2\frac{1}{3}$  turns from lock to lock.



**FRONT WHEELS ARE DRIVEN** by swing axles with constant-velocity universals. The front suspension cone, not visible here, is above the top wishbone, inboard of the shock.



# NEW FROM EUROPE The Amphicar: What It's Like to Drive

*As I sloshed ahead at 12 knots, I began to see that this thing, half boat and half automobile, had a split personality.*

**By Robert Gannon**



*The thing looked simple—too simple, in fact. I found that out soon enough.*



*First off, I got my gears all mixed-up, and started driving away stern-first.*



*We splashed into the water. "Throw out the anchor, maybe?" I asked.*

I'VE just driven-piloted an Amphicar—the new little import that rides on land or water. We were introduced to it by Leonard Spiegel, whose company imports them from West Germany.

I climbed over the high door sill and slid behind the wheel. Instruments and controls looked familiar, but there were some additions. Next to the speedometer was a tachometer with an extra scale for propeller r.p.m. There was a lever sticking out from under the dash to put the twin propellers in neutral, forward, or reverse. And through the wraparound windshield, I noticed that horn and directional lights were mounted out in the open, on top of the hood and fenders.

Mr. Spiegel and a mechanic hopped in. I fired up the little four-cylinder Austin engine and shoved the floor-mounted shift lever into first. When I let up the clutch pedal the Amphicar promptly backed up. Wrong gear.

"Sorry," I apologized. "I'm not used to driving boats on land."

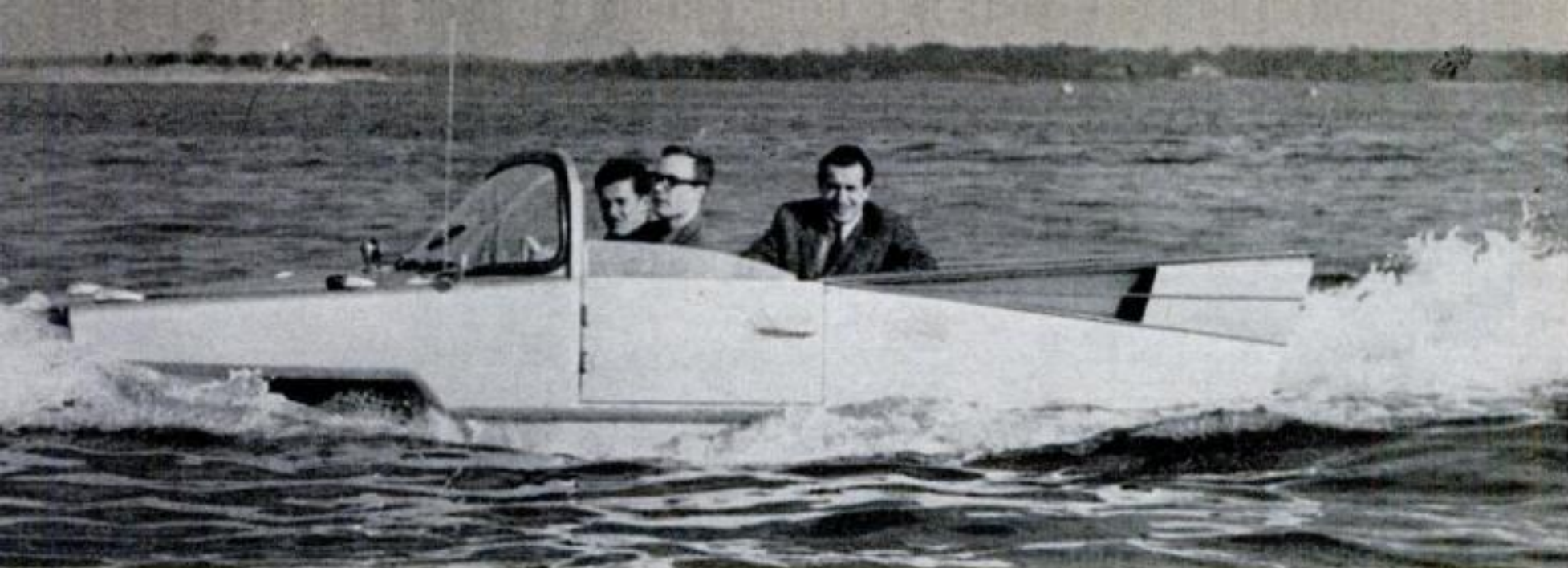
"On land," Mr. Spiegel corrected me, "the Amphicar is not a boat—it's an automobile."

I felt around again in the four-speed gearbox. This time I did better. She



*Here I was on the briny deep in a car-turned-boat—without a rudder.*





lurched forward, engine roaring noisily.

I turned the steering wheel and she spun in a tight little turn like a Jeep. We jounced down a ramp to the water.

I slowed down. "Drive right in," Spiegel directed. He switched to nautical language: "When her stern floats clear of the bottom throw her in neutral and engage the props."

**Anchors aweigh.** We hit Long Island Sound at a good clip, splashing water in all directions. I half expected the engine to quit, but it was safely tucked away at the rear—oops, stern. We drifted. I began shifting levers. Nothing seemed to work.

Suddenly the propeller-control lever slid into the proper slot. The propellers bit into the water and we got under way.

As we sloshed ahead, pushing a bow wave, a new worry struck me. "Where's the rudder?" I yelled.

"There is no rudder," said the mechanic placidly. "Just turn the front wheels." He was right. With almost as much control as on land, I could swing around sharply. Whether because of her weight or 12-knot top speed, the Amphicar stayed level. We shipped no water.

Gee, this is fun, I thought as I wheeled around in the channel. Nothing to it.

But then a seaplane that had just landed headed across our bow. I tramped on the brake pedal. Absolutely nothing happened. Alarm knotted my stomach as we churned relentlessly toward the plane.

"Reverse, reverse!" someone shouted in my ear. Frantically I jammed the control lever into another notch. The props reversed and we quickly slowed, and then began backing up. I switched to neutral and sat there a moment.

"I'm not used to driving cars in the water," I said defensively.

"In water," Spiegel corrected me, "the Amphicar is not a car—it's a boat."

**Making port.** I headed for shore—apprehensively. The tide was low, leaving a steep stretch of pebbly beach to negotiate between water and paved ramp.

"When she touches bottom, throw her into drive," the mechanic warned.

We touched and I threw her into drive.

"More gas!"

I floored the accelerator. The Amphicar's front wheels lurched onto the beach. She hesitated, and stalled—stuck, half in and half out of the water.

I looked at Mr. Spiegel inquiringly. "You broke it," he said coldly.

*[Continued on page 219]*



*In a near-collision I jammed on the brakes. We kept right on going.*



*We were half in and half out of the water. It seemed appropriate.*

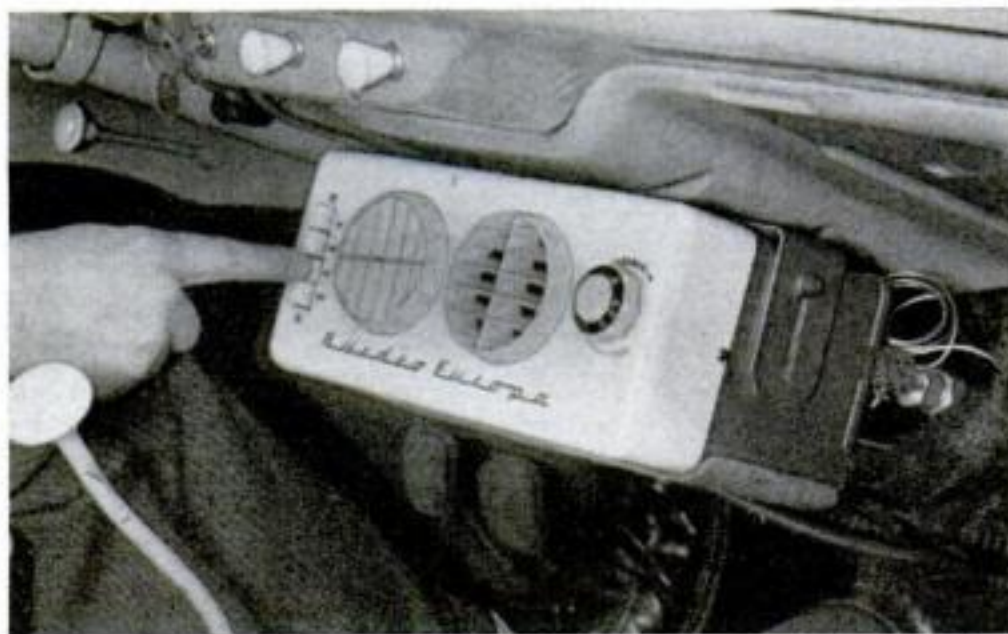


## NEW FROM EUROPE

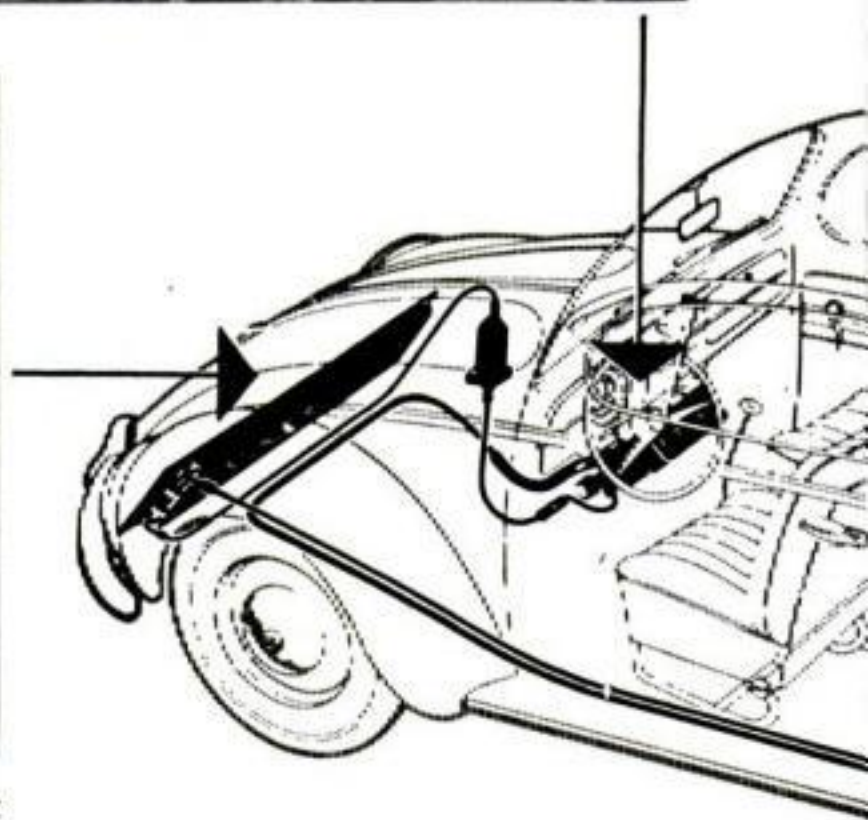
# Air Conditioning for Little Cars

**Drivers of imports can play it cool this summer with a unit that takes only 1.6 hp. from the engine**

**COLD AIR RUSHES OUT** of two louvered exhaust ports that can be rotated to direct it. Pushbuttons on left control blower speed. Knob on right is thermostat.



**FRONT CONDENSER COIL** is bolted to VW's underbody, just forward of front wheels (photo is from beneath car), exposing it to the air stream—and to flying rocks.



**O**WNERS of VWs, Renaults, or any of 24 other foreign cars\* can now be cool as any Cadillacker. The Bock Co. of Hamburg, West Germany, is prepared to unswelter the little cars with an air conditioner.

Power for the unit comes from an extra take-off pulley on the generator, which is belted to a compressor. In the VW installation, Freon-12 flows from the compressor through plastic tubing to condensers fore (under the body) and aft (on the firewall) where it gives up its heat as it liquefies. Cooled, it now goes to an under-dash evaporator to pick up interior car heat, and from there to the compressor for a new cycle. The maker claims that the unit steals only 1.6 hp.

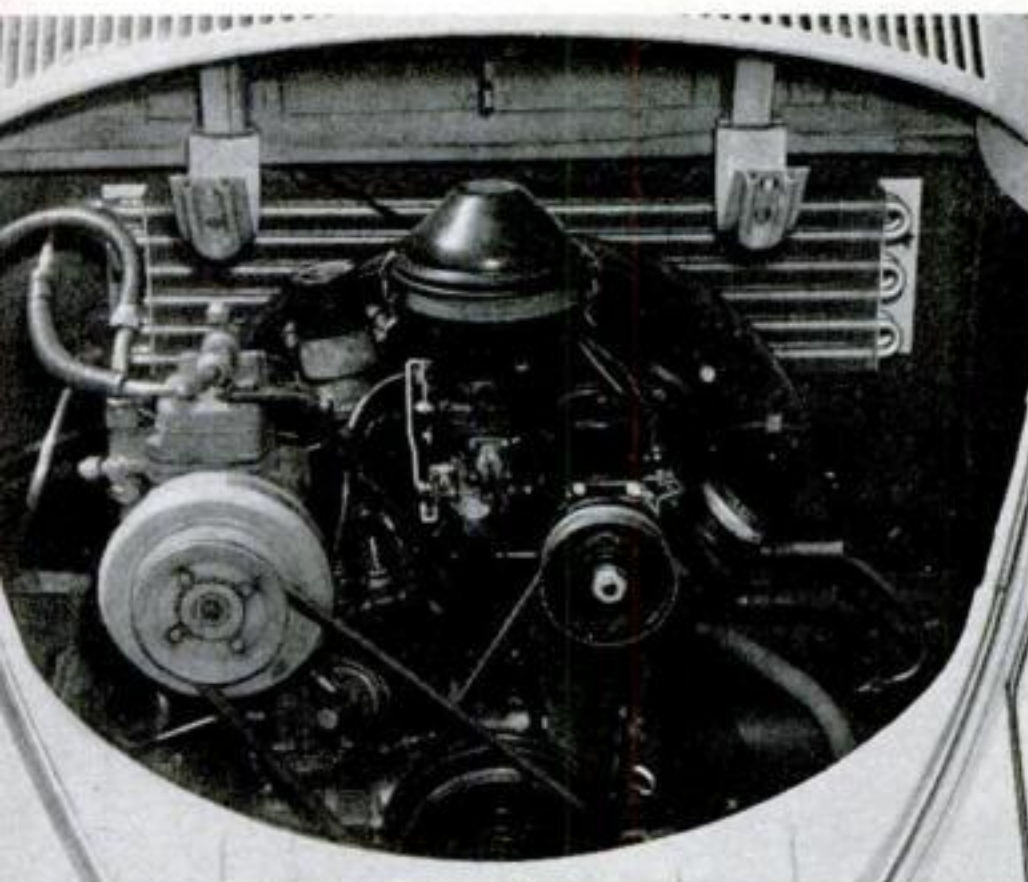
\*Various models of Borgward, DKW, Fiat, English Ford, Hillman, Mercedes, NSU, Opel, Peugeot, Porsche, Saab, Simca, Taunus, and Volvo.

One distributor of the Burdco Europa air conditioner—its name in this country—hooked it onto a VW and cooked the car in a heat tunnel until interior heat rose to 85 degrees. At 350 engine r.p.m., temperature dropped to 57 degrees in a half-hour, it was reported. At 2,000 r.p.m., there was a further eight-degree drop in the second half-hour.

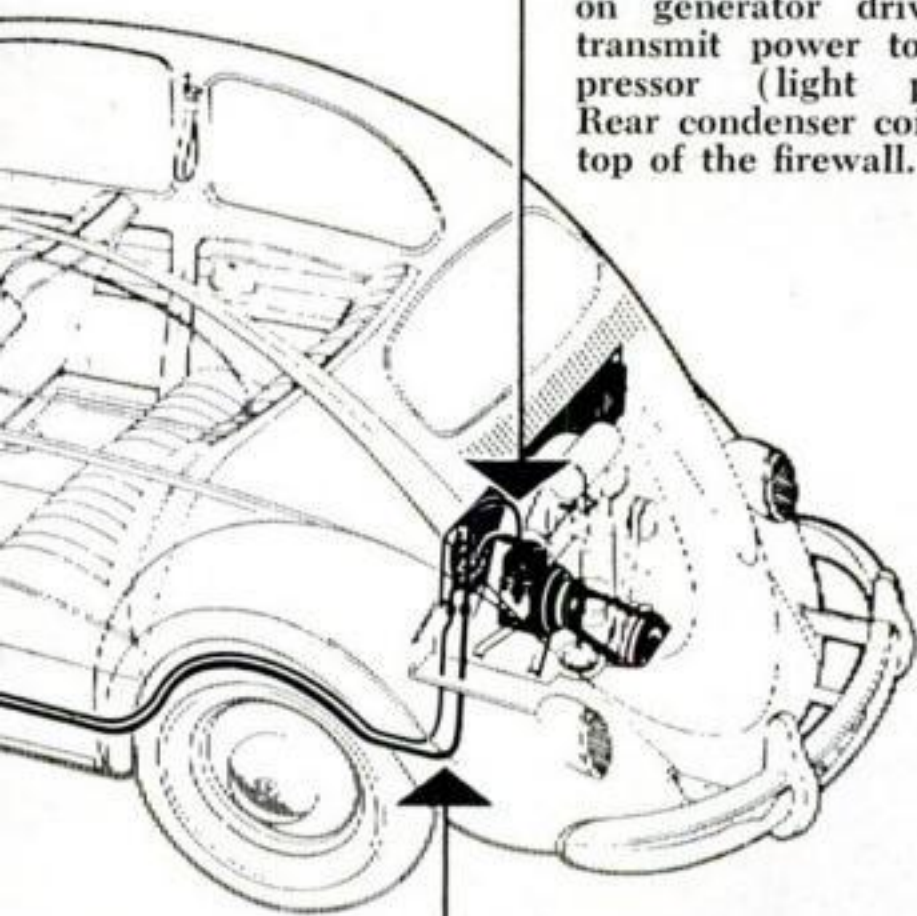
A PS writer (and VW owner) drove the car and reported an abundance of cool air, regardless of engine speed. He did notice a distinct loss of pep when accelerating with the compressor working.

The air conditioners, imported by Alan E. Burden Co. of Houston, Tex., are sold through foreign-car dealers. They will cost about \$350 including installation—which takes one man a day. Mounting brackets come with the unit.

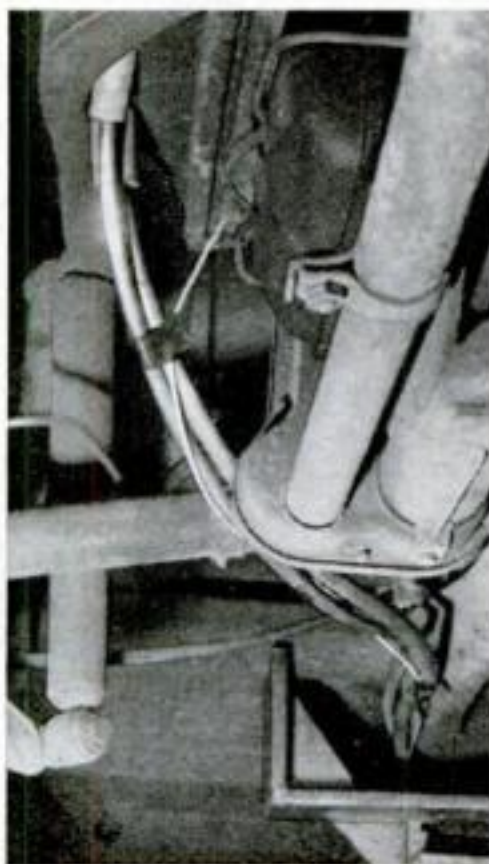




**EXTRA PULLEY** and belt on generator driveshaft transmit power to compressor (light paint). Rear condenser coil is at top of the firewall.



**TWO PLASTIC TUBES** and a wire run under the car, connecting front and rear units. One tube carries Freon-12 from rear condenser to forward condenser. The other carries Freon vapor from the under-dash evaporator to the compressor. Wire connects the thermostat on the evaporator case to a magnetic clutch on the compressor. When thermostat goes "on," clutch engages the drive pulley. With thermostat "off," the drive pulley idles.



**SMALL BUT SMART**, Borgward's new front-drive economy car includes such extras as backup lights, a trunk light, and front-seat backs that lock to protect rear-seat riders in stops. The little car is priced at \$1,795, New York.

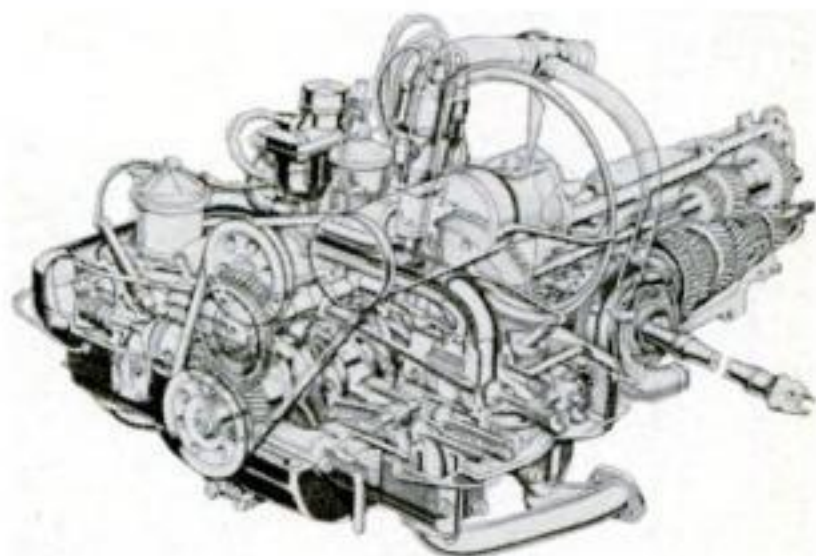
**Little Fräulein from West Germany...**

## The Arabella

**FINNED** light-alloy brake drums, an opposed flat-four driving the front wheels, and a four-speed box synchronized in all gears are some of the twists built into Borgward's new economy car, the Arabella. This two-door rides on an 86 $\frac{5}{8}$ -inch wheelbase, 13-inch wheels.

Its water-cooled engine is substantially over-square (2.72-inch bore, 2.36-inch stroke) and is rated at 42 hp. at 4,800 r.p.m. The torque curve is very flat between 2,400 and 4,000 revs. Manufacturer's performance curves show zero-to-50 acceleration in less than 17 seconds, a top speed of 75 m.p.h., and 32 $\frac{1}{2}$  miles per gallon of fuel at a steady 56 m.p.h.

The car has binnacle instrument grouping, padded dash edges and roof pillars. An under-trunk cradle, releasable from inside, carries a spare wheel.



**PANCAKE ENGINE** of the Arabella has off-center fan and radiator. Rear-mounted transmission returns power forward to the swing axles. There is no straight-through drive on the car, even in fourth (top) gear, which has a slight reduction ratio of 1.09:1.

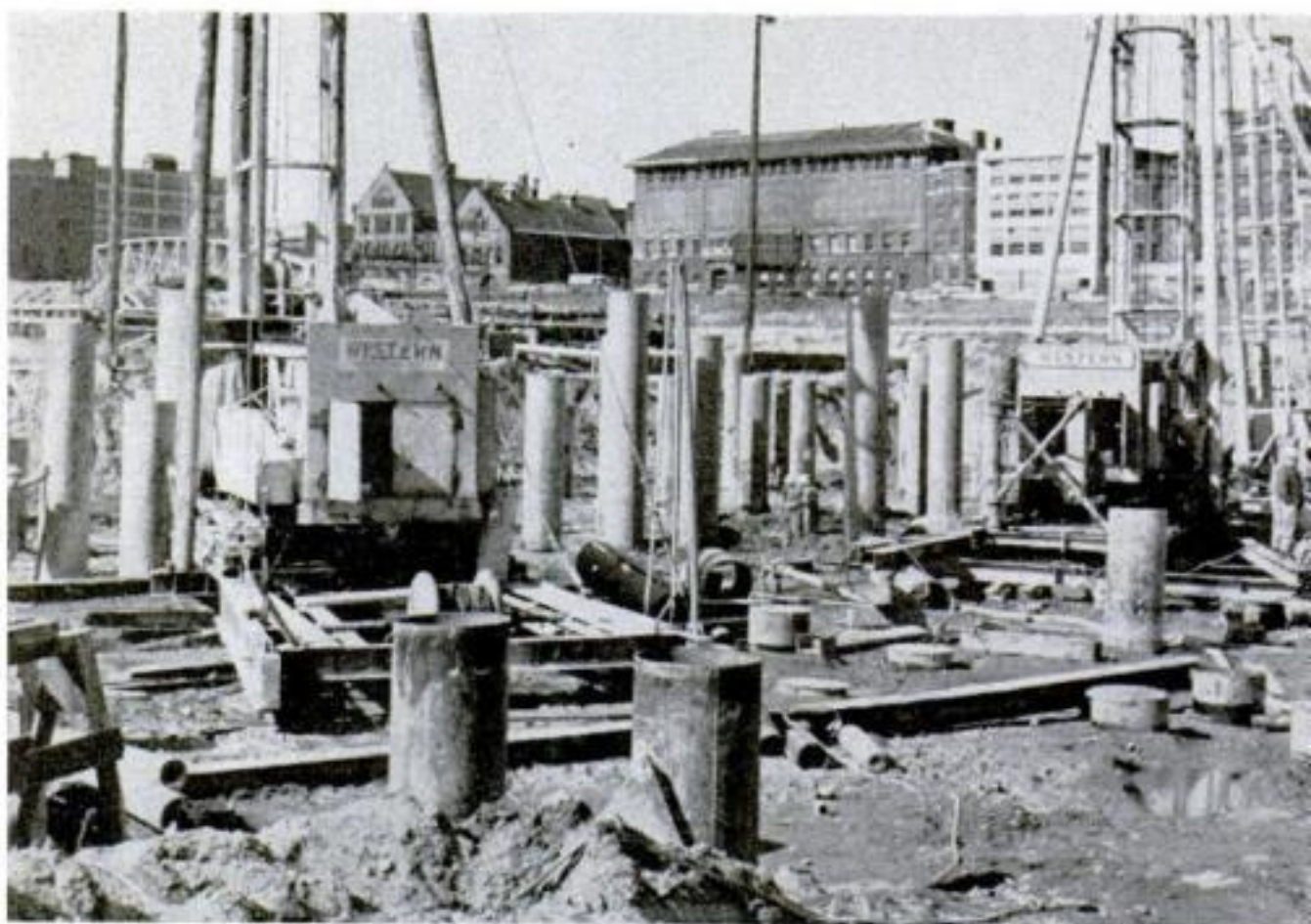


## Television goes underground

A TV camera housed in a plastic bubble tells engineers what's going on in bedrock 150 feet below the surface of the earth.

It's sent down through each of 144 steel caissons that will help form a foundation for the \$100,000,000 Prudential Center skyscraper being built in Boston.

What it sees is reflected on a closed-circuit monitor screen housed, with receiving equipment, in a portable shack that can be wheeled or lifted by crane to each caisson. Its 25-mm. f/1.5 lens reproduces a high-definition picture of 550 to 600 lines resolution—or almost twice as clear as that of the average home television screen. The scene being televised is lighted by two 150-watt projection lamps mounted be-



**SOME OF THE 144 CAISSONS**, many of them filled with water, through which the camera is sent. Before the television eye took over the job, divers descended—often head first.

side the camera. The assembly is on a turntable that can be tilted 180 degrees or revolved in a complete circle.



## Duck returns to water

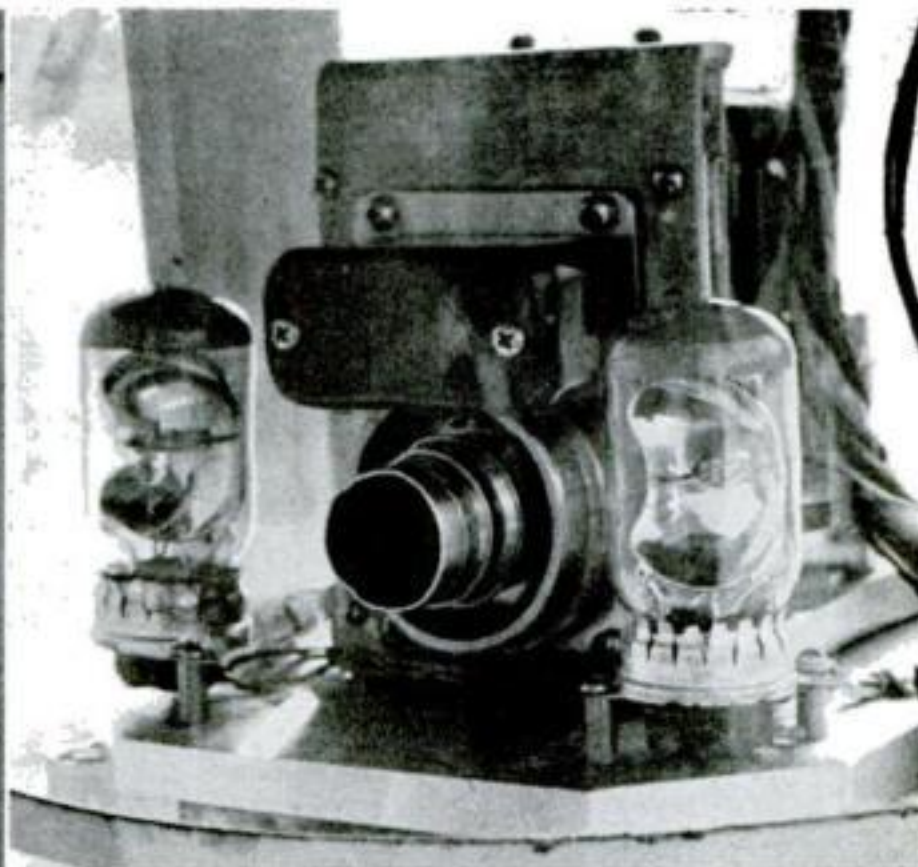
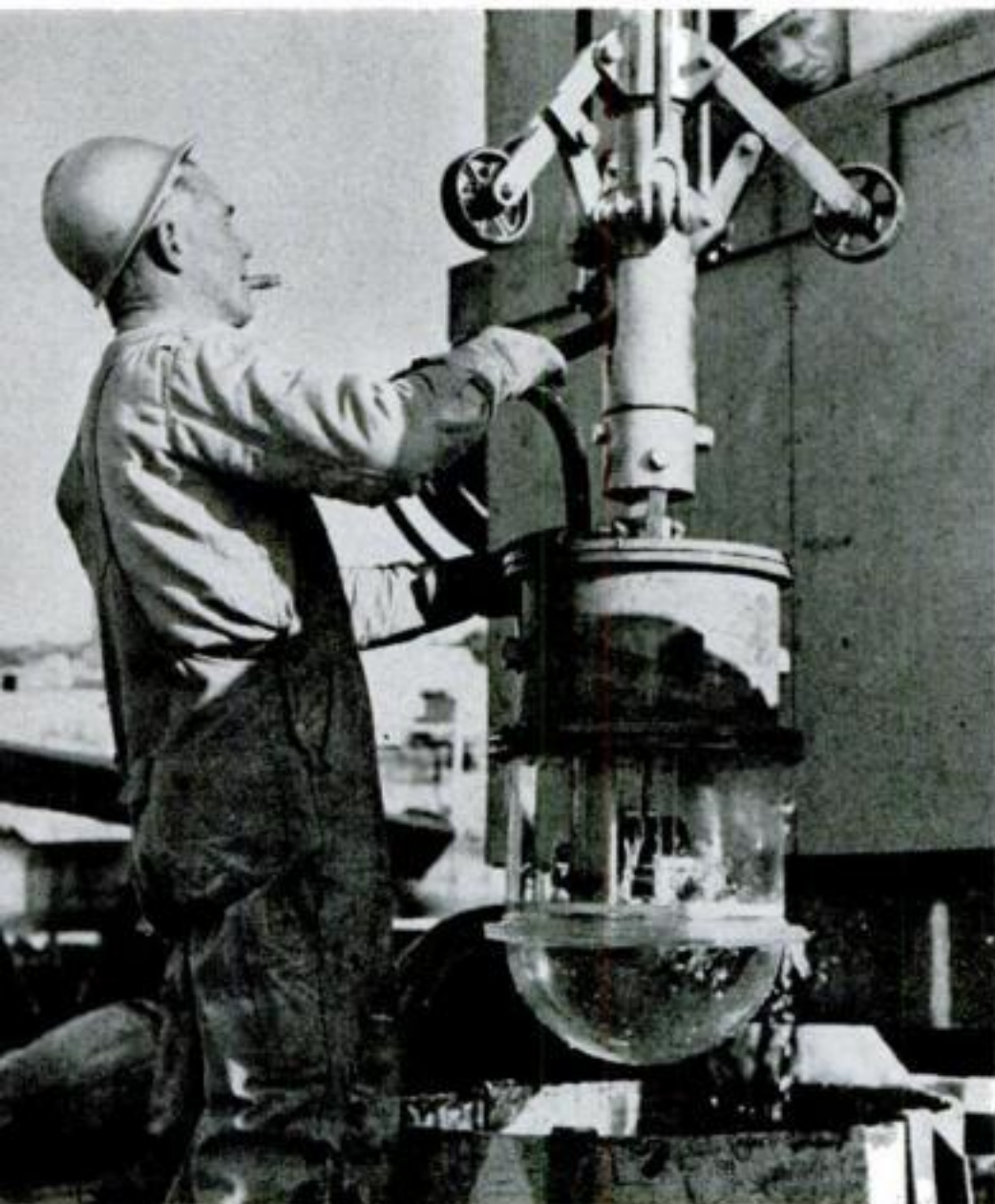
This float from a World War II Grumman J2F amphibian Duck was bought as Navy surplus by H. W. Bandy of Bath, S.C. He made it a fishing boat by installing a Jeep engine. The boat has a built-in trailer: retractable wheels.

## Giant gilded bird cage

This geodesic structure, 99 feet in diameter and 20½ feet high, is built of gold-anodized aluminum tubing and covered with two-inch aluminum mesh, also colored gold. It's for the birds—storks, cranes, and other exotic feathered creatures—in Busch Gardens at Tampa, Fla.







**CLOSE-UP OF TV CAMERA** shows lamps mounted at either side to light deep hole. One remains lighted, the other can be turned off or dimmed to prevent reflection or get special effects.

**WATERTIGHT BUBBLE** is withdrawn at left after TV picture has been telecast from caisson. Wheeled tripod over it rides inside pipe to keep apparatus on steady course and prevent damage.



### Target for rocks

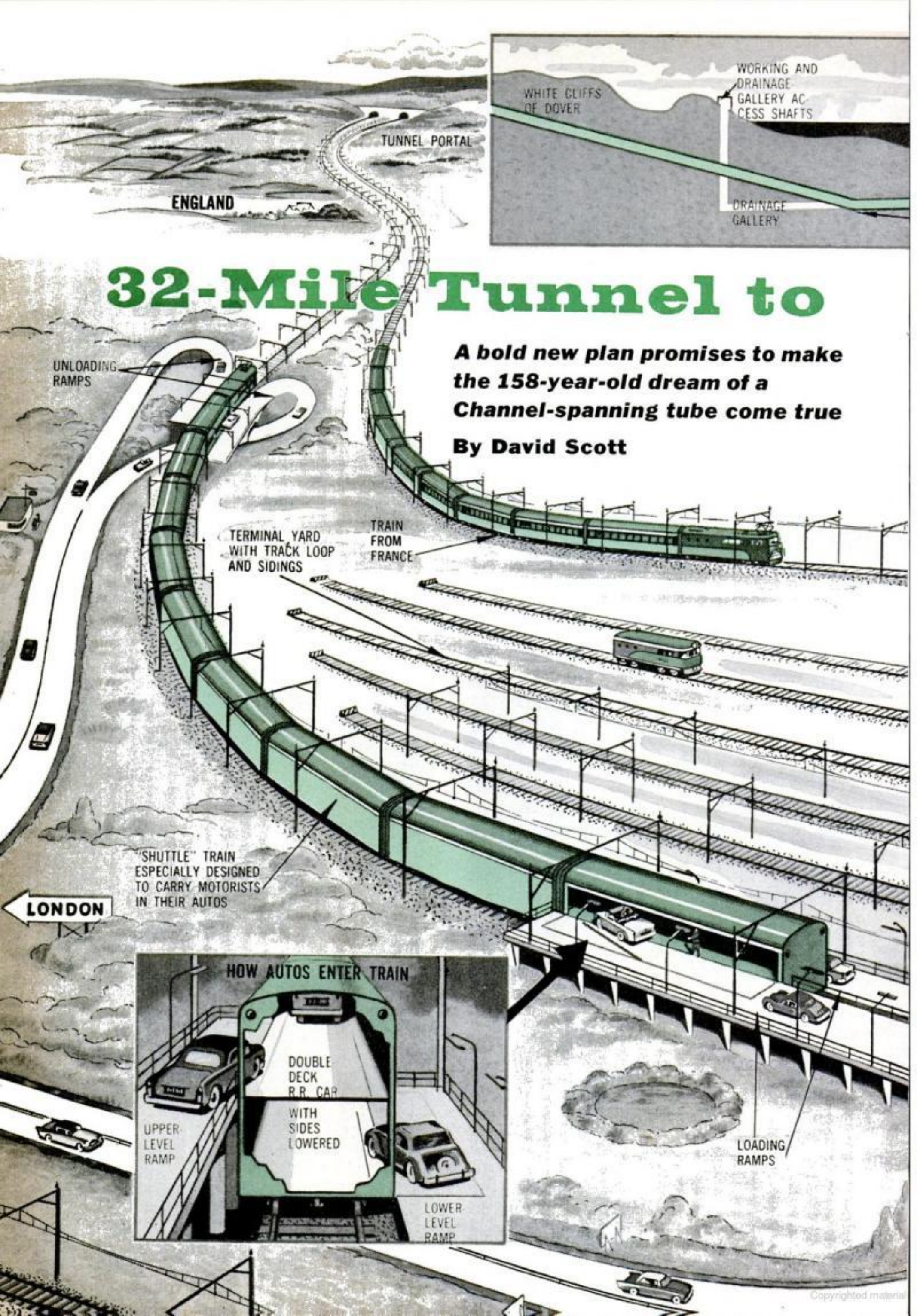
Erected by a real-estate agent on New York's Long Island to catch the eye—and rocks—of passing youngsters, the bull's-eye sign above makes an enticing target. It also saves the firm's nearby advertisement from damage by stoning.

### Oxygen whiffer

A big drug store on the Champs Elysées in Paris put in the oxygen machine at right to supply quick pickups for tired shoppers. For one new franc (about 20 cents), a customer can inhale 20 quarts of pure oxygen—scented with perfume.







ENGLAND

TUNNEL PORTAL

WHITE CLIFFS OF DOVER

WORKING AND DRAINAGE GALLERY ACCESS SHAFTS

DRAINAGE GALLERY

# 32-Mile Tunnel to

**A bold new plan promises to make the 158-year-old dream of a Channel-spanning tube come true**

**By David Scott**

UNLOADING RAMPS

TERMINAL YARD WITH TRACK LOOP AND SIDINGS

TRAIN FROM FRANCE

LONDON

"SHUTTLE" TRAIN ESPECIALLY DESIGNED TO CARRY MOTORISTS IN THEIR AUTOS

HOW AUTOS ENTER TRAIN

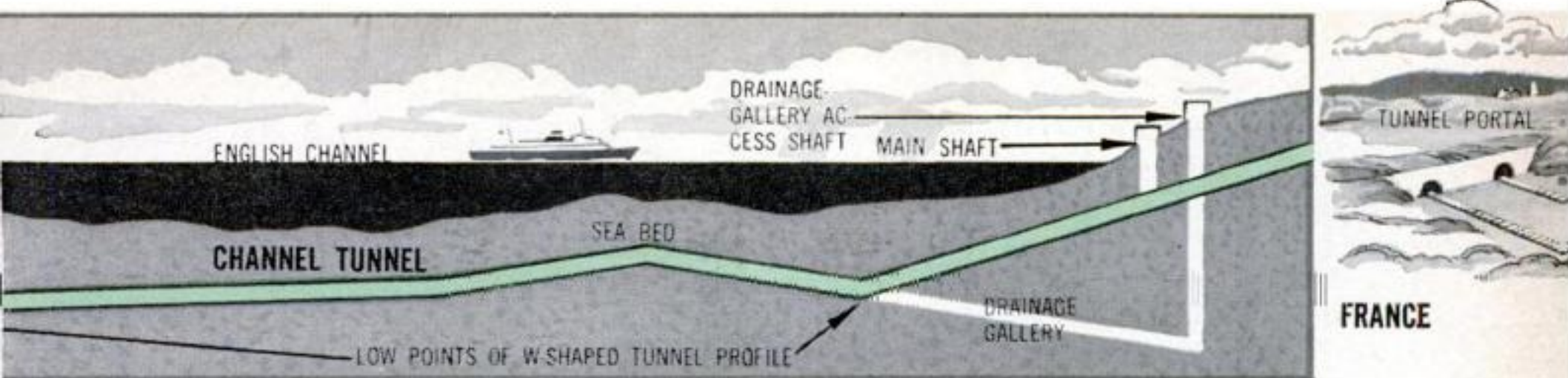
DOUBLE DECK R.R. CAR WITH SIDES LOWERED

UPPER LEVEL RAMP

LOWER LEVEL RAMP

LOADING RAMPS





# Connect England and France

**F**ROM a ramp, you drive right into a railway car at the rear of an electric train, standing at a terminal near Folkestone, England. You pilot your auto forward through the cavernous interior of the train—its cars are joined by platforms to make a continuous runway—and stop behind the next-earlier arrival. Other autos draw up behind you. Then the train starts, speeds nine miles above ground, and plunges into the most remarkable tunnel in the world.

Still sitting in your automobile, you are borne for 23 miles beneath the waters of the English Channel, at an average speed of 60 m.p.h. In less than 45 minutes, the train rolls to a stop. Motorists restart their engines, and you drive off the front of the train to find yourself in France. As you disembark at the French terminal near Calais, you see another line of autos about to board the

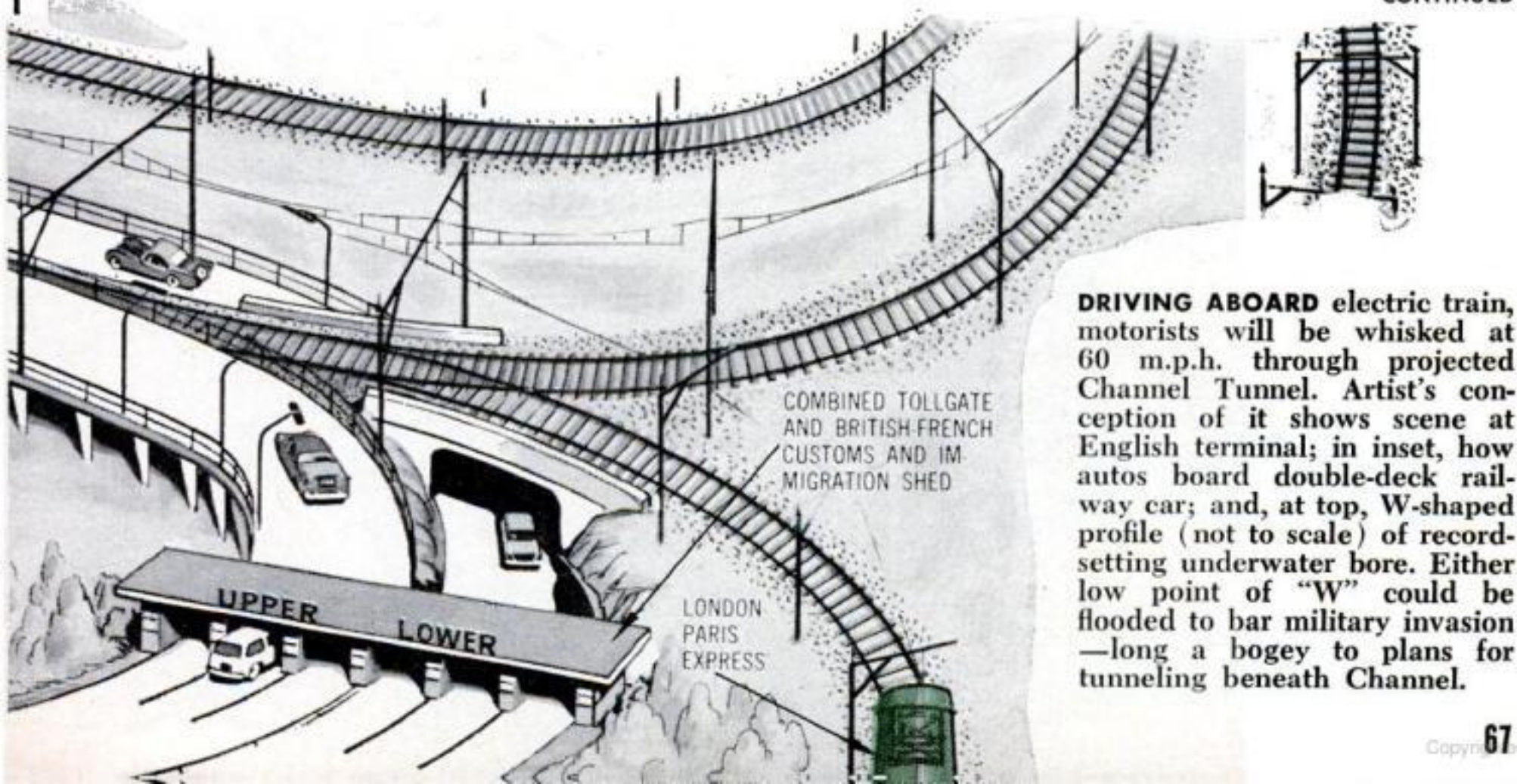
train for its return trip to England.

That is a preview of high-speed, all-weather, comfortable, and inexpensive travel between England and France by 1967, if a startling plan to drive a tunnel beneath the Channel goes through.

At 32 miles from portal to portal, it would be the world's longest passenger tunnel by so far as to be in a class by itself. It would dwarf the Alps' famed 12-mile Simplon rail tunnel, and the seven-mile vehicular tube under construction through Mont Blanc, the present and prospective record holders of their kinds. Its cost would exceed the \$300,000,000 value of the British crown jewels. Like the Great Pyramid of Egypt and the Panama Canal, the proposed Channel Tunnel would rank among the engineering wonders of all time.

Latest of many schemes to link Britain and France by tube or bridge, this mod-

CONTINUED



**DRIVING ABOARD** electric train, motorists will be whisked at 60 m.p.h. through projected Channel Tunnel. Artist's conception of it shows scene at English terminal; in inset, how autos board double-deck railway car; and, at top, W-shaped profile (not to scale) of record-setting underwater bore. Either low point of "W" could be flooded to bar military invasion—long a bogey to plans for tunneling beneath Channel.



## Train-carrying tubes are to be bored full-size by giant

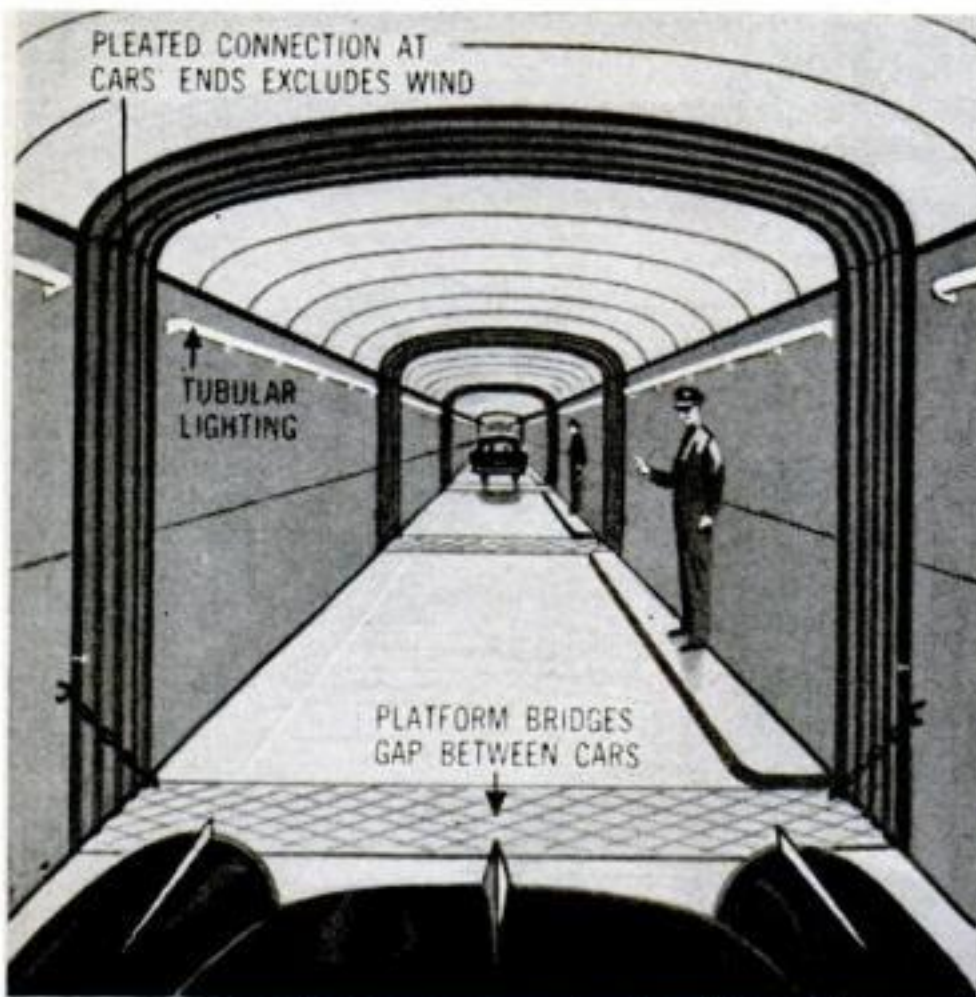
ernized plan brings the 158-year-old dream nearer realization than ever before. Calling for a twin-tube rail tunnel, it is sponsored by influential English-French-American interests collectively known as the Channel Tunnel Study Group. With encouragement from high places, they recently submitted their proposal to the British and French Governments, upon whose approval its fate now hangs.

The plan envisages two main tubes running side by side, 97 feet apart, between portals near Dover in England and Calais in France. Bored through the Channel bed, they dip 100 to 200 feet below the sea floor. Each circular tube has an inside diameter of 21 feet 4 inches and holds a single railway track.

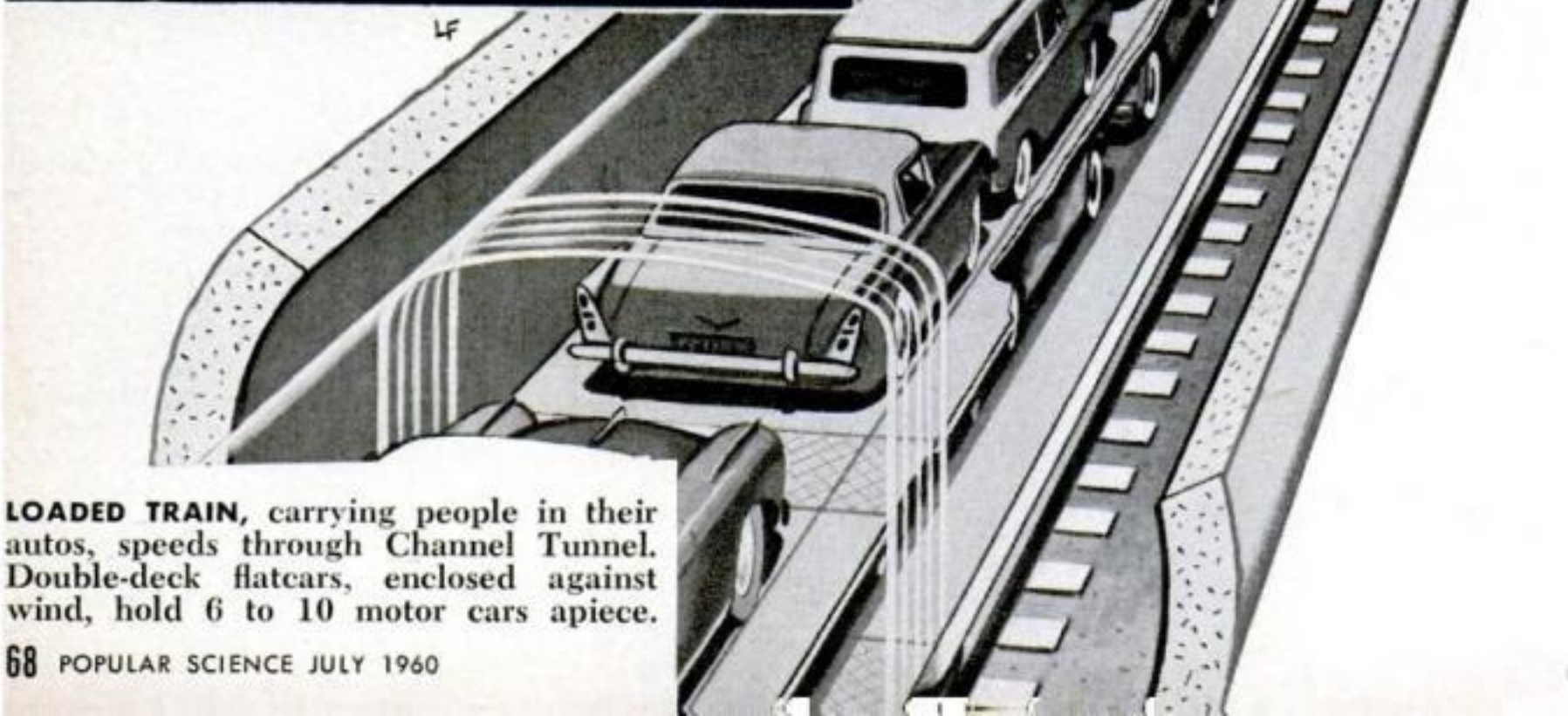
**Shuttle trains**, especially designed to

carry motorists in their autos, run through the tunnel at 15-minute intervals, plying the 44-mile distance between the terminals beyond its portals. A loop of track at each terminal turns the train around for the return trip.

While single-deck flatcars may serve at first, the final plan is for double-deckers, enclosed to reduce air drag and shield passengers from wind. Each holds six to ten autos, according to their size. Made up of perhaps 30 cars, the train is loaded at the rear and unloaded at the front, through special drop-sided cars, at two-level ramps. To streamline international formalities, a joint British-French customs and immigration shed is combined with the tollgate spanning the approach to the loading ramps.



**INTERIOR** of auto-carrying shuttle train will look like this to motorist as he drives forward through it to take his place in line for trip under Channel.

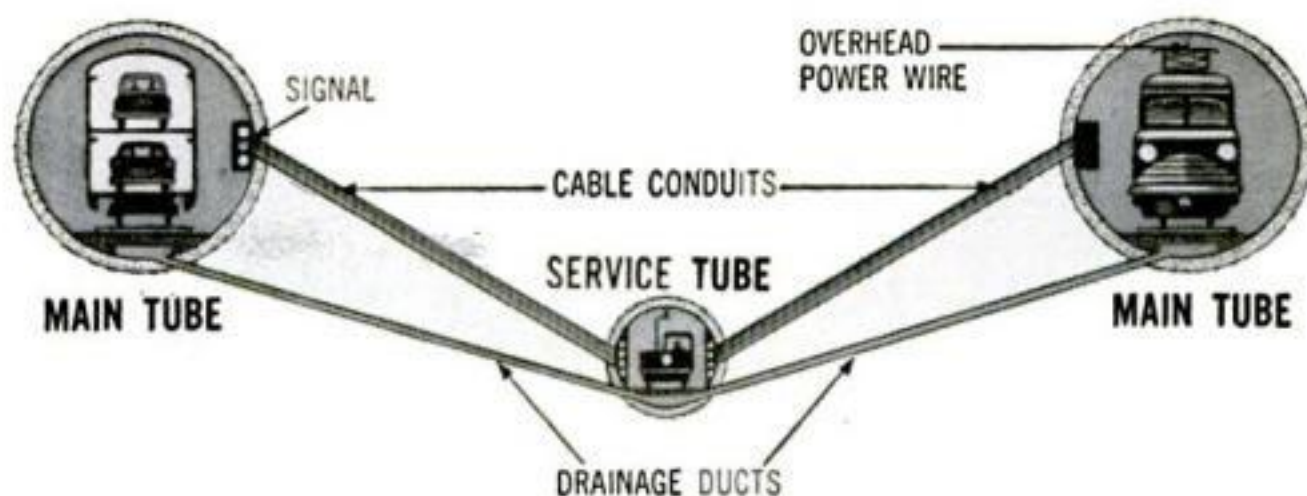


**LOADED TRAIN**, carrying people in their autos, speeds through Channel Tunnel. Double-deck flatcars, enclosed against wind, hold 6 to 10 motor cars apiece.



## rotary machines

**EACH MAIN TUBE**, shown in sectional view of Channel Tunnel, has inside diameter of 21 feet 4 inches and carries electric trains in one direction. Smaller service tube below them provides for drainage and maintenance.



Through passenger and freight trains use the tunnel, too. Express-train passengers speed from the center of London to the center of Paris, via the tunnel, in only 4 hours and 20 minutes.

Each main tube normally carries trains one way. But trains can be shunted from one tube to the other at four crossovers—one at each coast, the others seven miles offshore. Thus a section of either tube can be closed off for repairs or maintenance. At night, when this would be done, trains running back and forth through one tube could handle the light traffic.

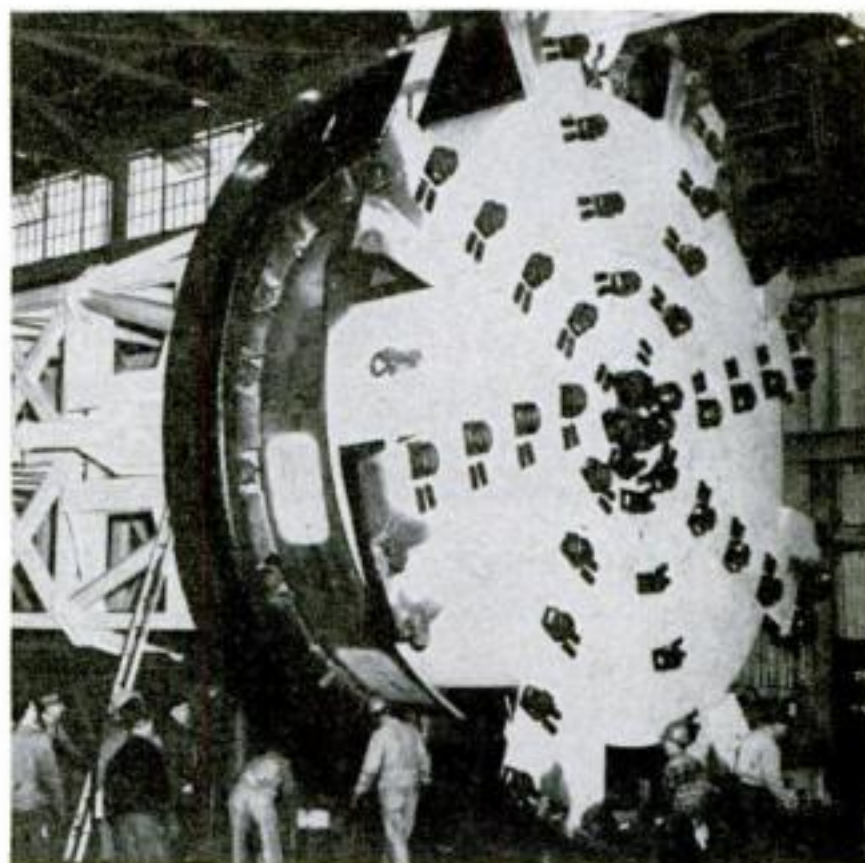
Between and below the main tubes, a service tube about 11 feet across serves for draining them, for maintenance, and as an electric-cable conduit. Cross passages connect it with the others. The service tube slopes downward from mid-Channel to the bottoms of vertical access shafts on each coast. These house elevators, ventilating ducts, and pipes for pumping out seeping water.

**Fresh air.** Since the tunnel is used by electric trains, rather than by motor vehicles gulping air and belching exhaust fumes, ventilation is no problem. Engineers anticipate that the trains themselves, like pistons in cylinders, will aid in circulating fresh air through the long underwater section.

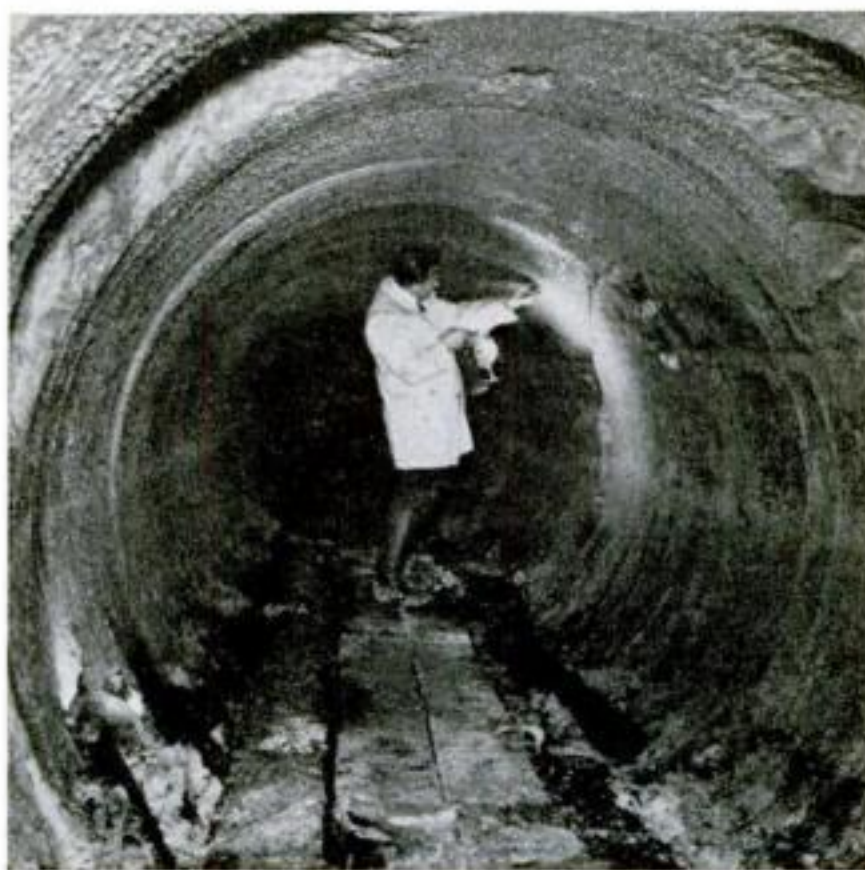
As novel as the rail tunnel itself is the scheme for excavating it. A giant rotary machine with a 23-foot 10-inch cutting head will literally bore the full-size tube through the Channel bed.

It will eat through a kind of rock ideal for tunneling. As if put there by providence, a 1½-mile strip of firm chalk lines the Channel at its narrowest point. All but impermeable to water, strong enough to need no support after being bored, it still is soft enough to yield easily to a

[Continued on page 213]

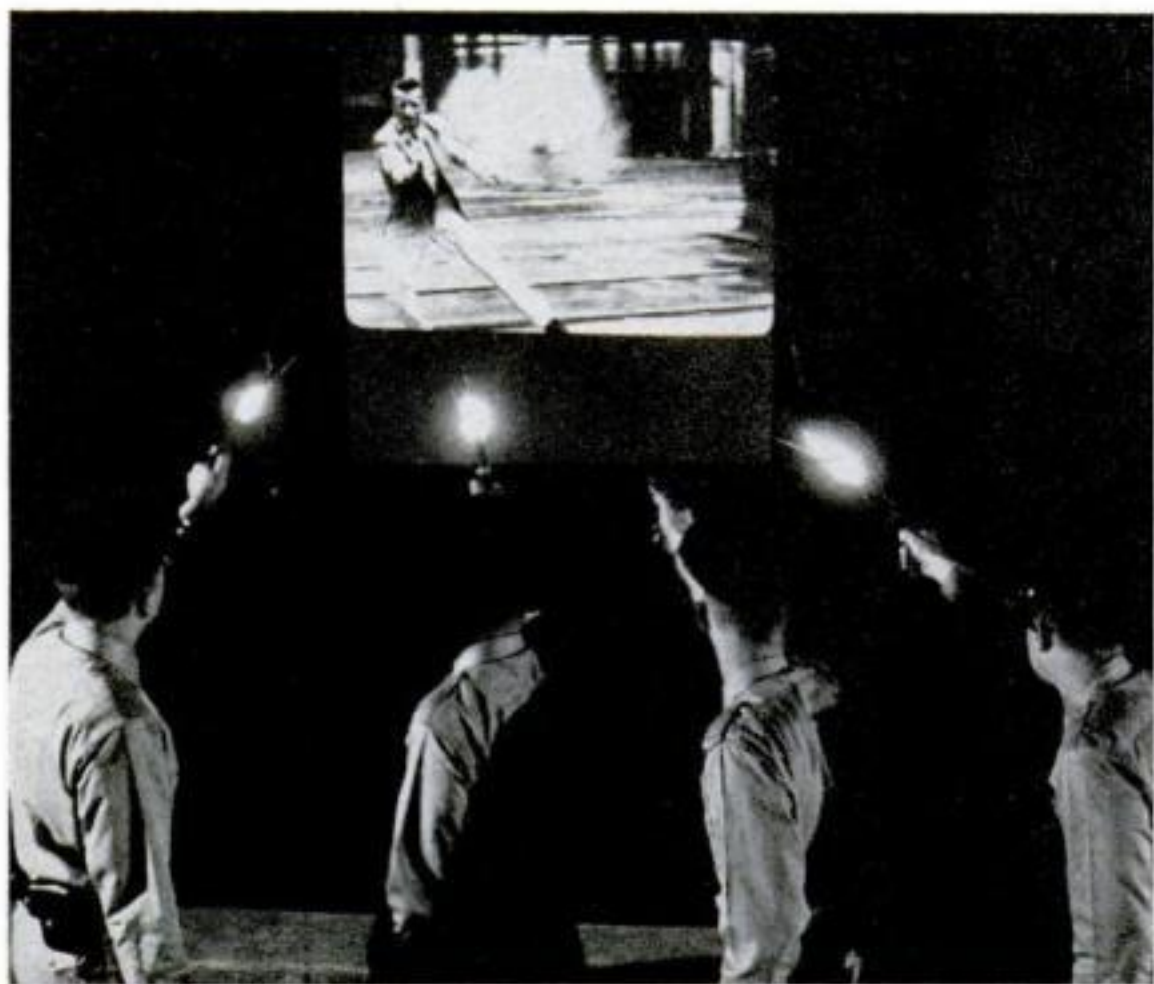


**HUGE ROCK BORER** like this mechanical mole, used at Oahe Dam in South Dakota, is expected to drive 23-foot-diameter hole for Channel rail tubes at the rate of 1,475 feet a month.



**ACTUAL START** on Channel Tunnel, in 1880s, produced seven-foot-diameter tube shown in this historic British Railways photo. Early boring machine, ancestor of big modern ones, drove it more than a mile from English side.

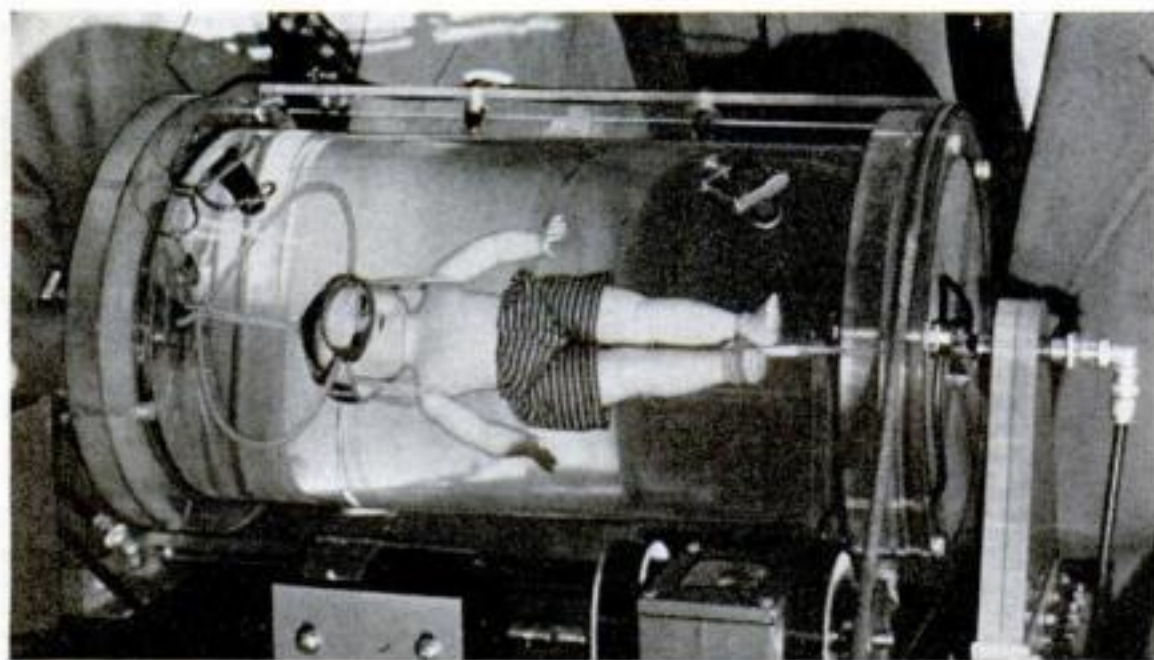




## To shoot or not to shoot

Fighting gun battles with a crook in a color movie keeps Los Angeles police on their toes. Above is a typical night scene on their open-air range. The cops fire live ammunition at a realistic gangster whose shootin' image is projected on a bed sheet 25 yards away. The sheet has to be replaced about once a month.

The point of the film, which runs 20 minutes with accompanying sound, is to teach cadets, patrolmen, and detectives to judge in a flash when to shoot and when to hold their fire. In addition to the supposed crook, the film has a cast of innocent bystanders and a couple of plainclothesmen, who sometimes get in the way.



## Doll is weightless in water tank

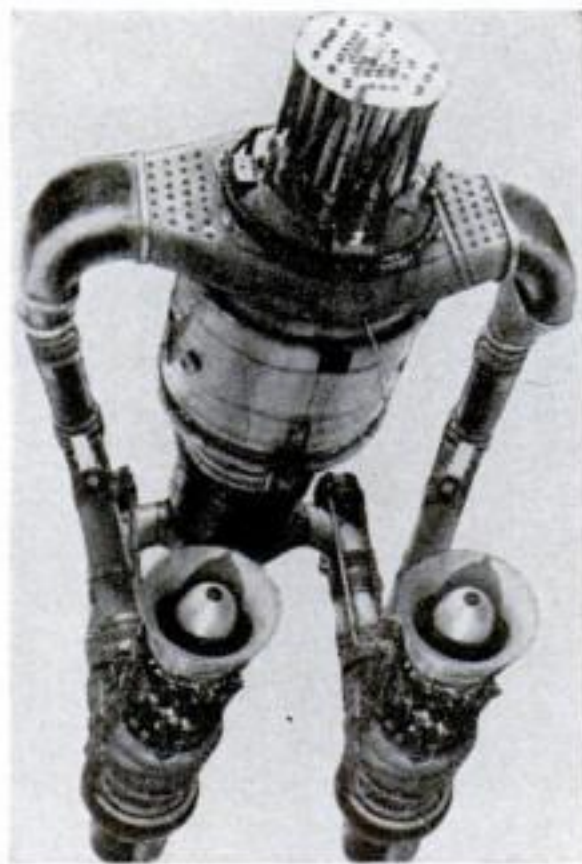
The doll above is floating weightlessly in a scale model of a revolving tank that may soon show how man will react in space. The spinning tank will subject an astronaut to long periods of weightlessness instead of the few seconds now achieved in parabolic plane flight. The experiments are being conducted at Lockheed's Marietta, Ga., research laboratories.



## Foreign truck

A new, light panel truck is being sold in the United States by France's Renault. It has front-wheel drive, with a 32-hp. engine that can be taken out in less than an hour for bench servicing.

The panel body has sliding side doors and a divided rear door—the lower half on side hinges, the upper part hinged at top.



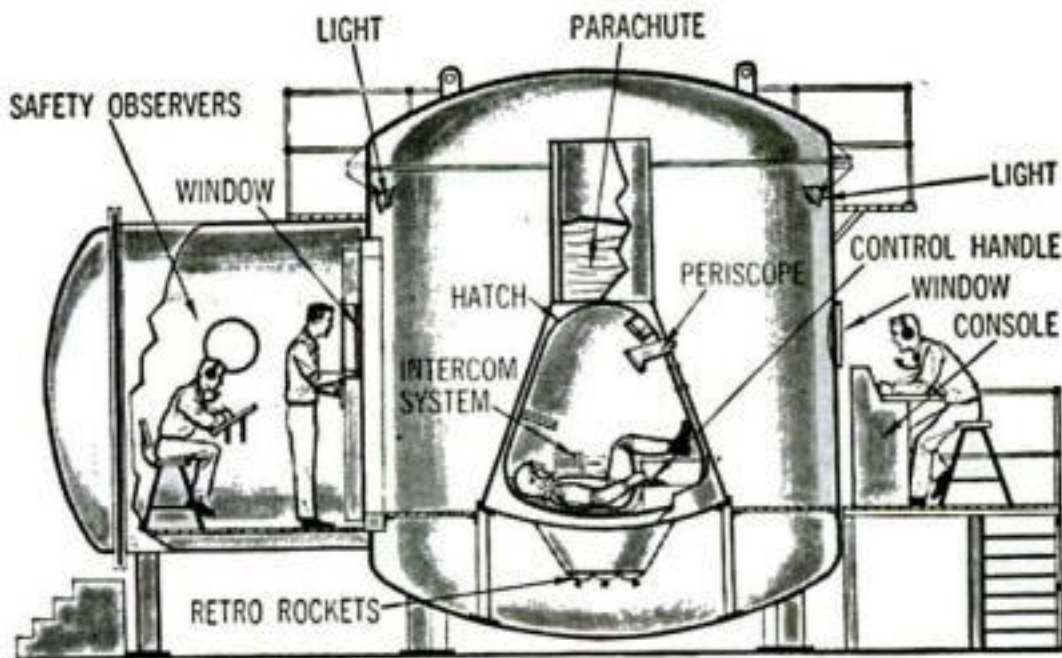
## A-power for flight

This robot-like device has been tested for 120 hours on the ground, but one day it may fly.

It's a new experimental heat-transfer reactor developed by GE for possible future nuclear aircraft.

The "robot's" body is the reactor. Its two "hands" hold turbojets. Here they look upright; in a plane they would be horizontal.





Altitude chamber simulates space pressure 40 miles up.

## Newest steps toward space

America's astronauts—the men who will be rocketed into space—have taken two more steps toward the threshold of their adventure.

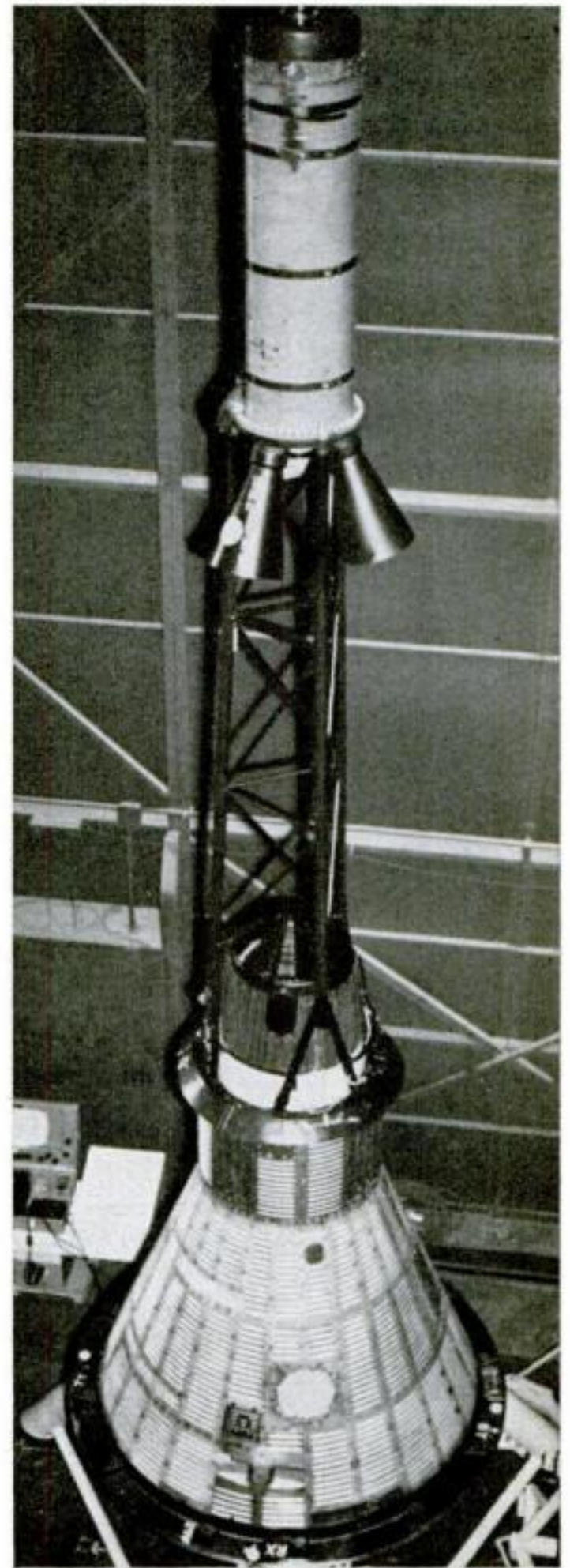
The first of their capsules is ready, and a tank to give them an advance taste of space flight, by simulation, has been built.

The actual capsule (right), the first of 20 being built by the McDonnell Aircraft Corp., St. Louis, has a base diameter of six feet and stands nine feet high. The first one will be used in unmanned flights from Wallops Island, Va., to test the pilot-escape system (atop capsule in photo).

The tank (above) will take the astronauts to a "height" of more than 40 miles—without leaving the ground. A mock-up capsule will be lowered into the tank, called an altitude chamber, through a hatch. Lying in it, an astronaut will be connected with the outside world through an oxygen line, an intercom system, and test wires.

Pressurization, or "dive," rates up to 50,000 feet a minute will be like those to be encountered when the capsule returns to earth from space. In an emergency the chamber can drop from 225,000 feet to sea level in six seconds.

Connected to the tank, being built by Tenney Engineering, Inc., for the National Aeronautics and Space Administration, will be an antechamber, to serve as an air lock and observation post.



First of 20 actual space capsules.

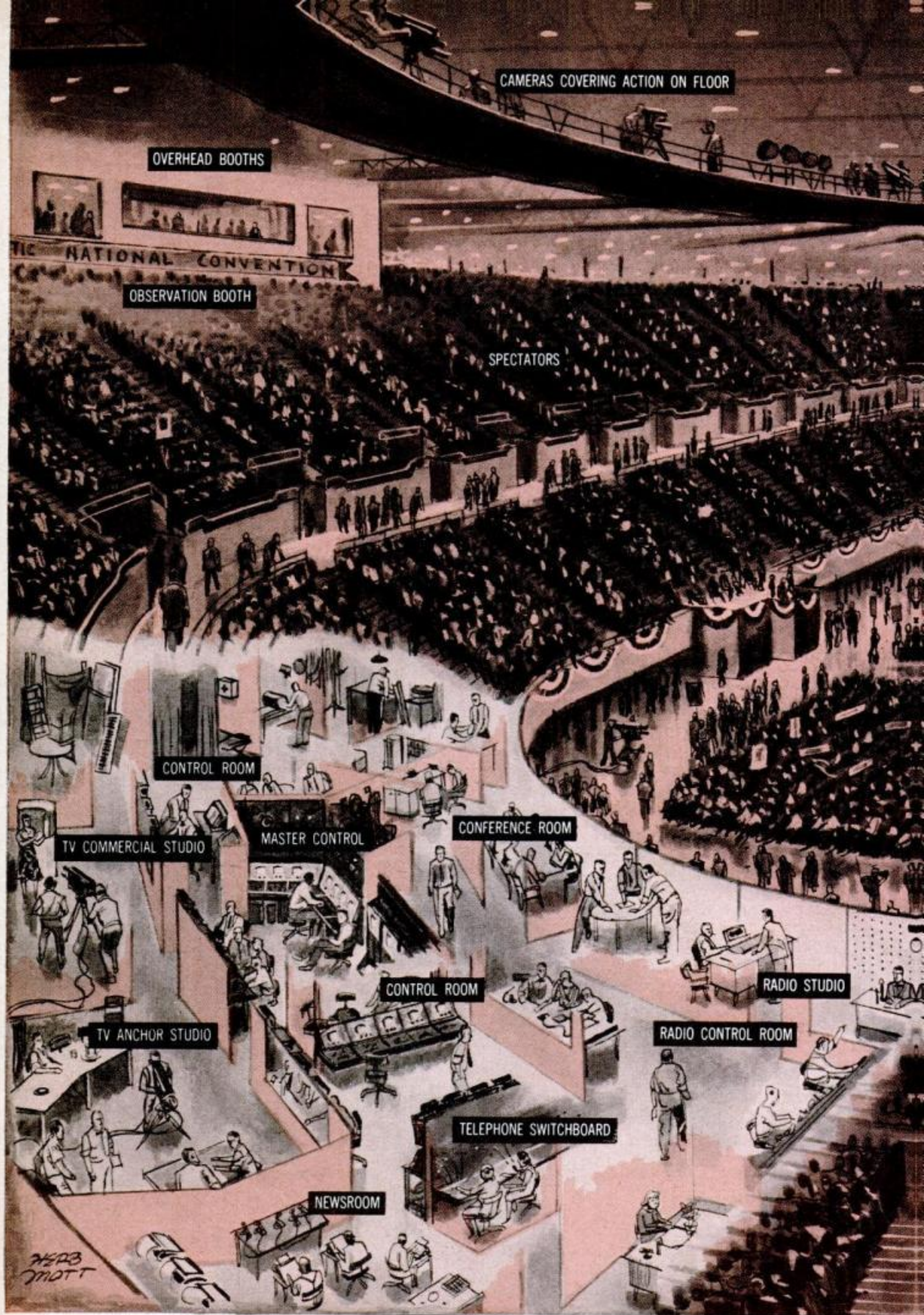
## Low-cost utility car

Here's the lowest-priced four-passenger automobile made in the United States. It's the Saviano Scat. It sells for \$1,390 including delivery, handling, and Federal excise tax.

The two-door vehicle, designed for work or play, is powered by a 25-hp. air-cooled engine, gets 25 to 30 miles on a gallon of fuel, and has a top speed of 50 m.p.h. Saviano Vehicles, Warren, Mich., makes it also to run on propane for indoor industrial use.









**A behind-the-scenes look at how the networks will cover the national political conventions**

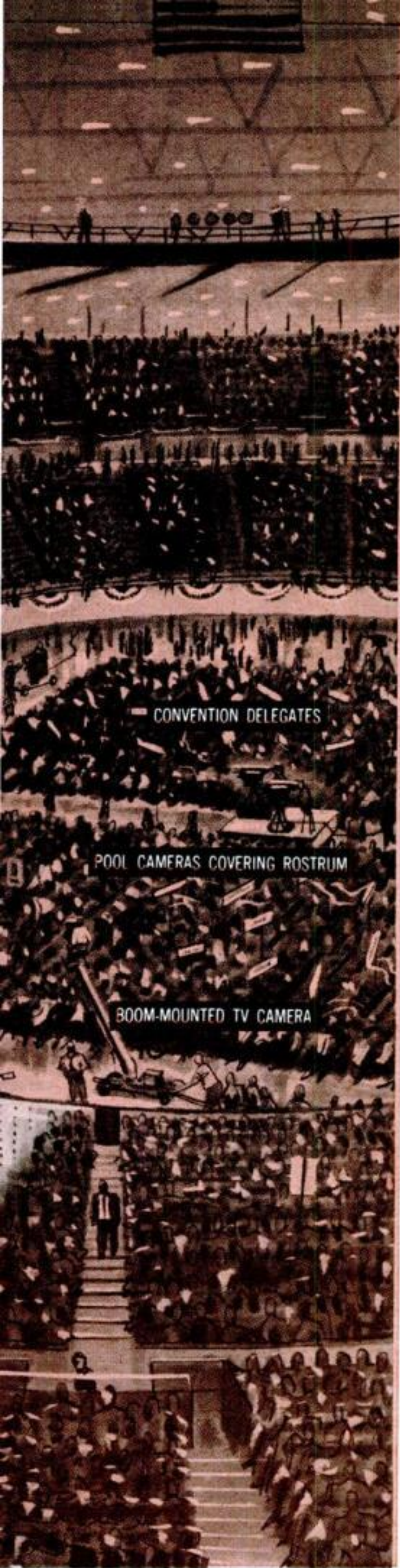
# 1960's Most Exciting TV Show

**T**HE curtain goes up this month on the biggest TV spectacular of the year: the real-life drama of the national political conventions that will select our next president. And you have the best seat. Straight to your living room, new tricks of electronic magic will bring a clearer and more colorful view of the politicking than even an official delegate sees.

This year the show should be more thrilling than ever. Partly, that's because there's more suspense in the plot. But the TV men have also refined their techniques to catch more action and less routine oratory. Video tape, not available in 1956, will eliminate many dull stretches.

**Men and money.** The television networks will spare neither men nor money to take you to the political battles. They'll spend several million dollars on these few days of telecasting (and get it back, plus profit, from sponsors). They'll dispatch more than 1,000 men (and a few women) to do the job.

Look at Los Angeles, where the Democrats light their fireworks July 11 in the handsome new Sports Arena. There each network is now finishing an entire TV station all its own (cost, without equipment: \$100,000-plus). The quarters are strictly temporary,



**SETTING FOR POLITICAL DRAMA:** Democrats convene this month in Los Angeles' modern arena (above). Drawing at left shows CBS facilities; other networks and independent stations have similar installations. Cameras on floor of hall are shared by all.





**DOZENS OF PICTURES** coming from cameras all over the city are displayed on monitor screens. Here, director chooses one to be sent out over air.

## ***Electronic magic gives you a ringside seat to watch the***

and will be knocked down as soon as the Democrats decide on their man. But they don't look temporary.

CBS' work area has 30 rooms, including two studios (the bigger one reserved for Betty Furness and her commercials), one master control, two studio control rooms, a newsroom, and such miscellany as a photographic darkroom, kitchen, mimeograph room, and medical office.

Similar areas are occupied by ABC, NBC, and the pooled facilities of independent stations. NBC alone is putting in more than 25 cameras, 20,000 feet of camera cable, 40,000 feet of telephone-intercom cable, and 14,000 feet of coaxial cable.

That's not all. Each network also has a smaller TV station, only slightly less elaborate, in the Hotel Biltmore, where the Democrats make their headquarters. And more: Mobile TV stations in trucks will catch newsworthy candidates wherever they are, at conference rooms or airport.

Ironically, all these temporary facilities are being installed in a city that is already lavishly equipped for television. There are seven local TV stations (one, KTLA, operates a helicopter-mounted camera that could supply some striking shots). And there are the gigantic sound stages for network TV production in Hollywood, which probably won't be used for convention telecasts at all.

The Republicans, who start their political circus in Chicago on July 25, will get the same treatment: special studios in the Stockyard Auditorium, more studios in the headquarters hotel, and mobile units, all in addition to excellent facilities at the local stations.

**Eyes of democracy.** These elaborate installations are one part of the massive press machinery that serves a vital purpose in a democracy: informing citizens so that they can vote intelligently.

Cameras and microphones spotted around the convention halls bring you the various philosophies of the candidates, and let you follow the intimate details of crucial votes. But many of the significant decisions are made informally, "off the floor." You'll be in on these,



**HELICOPTER CAMERA** can bring unusual outdoor views to the television audience. It broadcasts picture to station wagon (antenna on roof) which relays signal to main studio.



**INSIDE STORY:** Big-name commentators will expertize from "anchor" positions—large, impressively gimmicked studios. The photos here show NBC operations in 1956; 1960 will look much the same. At right, the reporting team of Chet Huntley and Dave Brinkley analyze one day's convention developments.



## **politicians choose a candidate for the world's biggest job**

too. Very small, hand-held TV cameras will catch discussions in the corridors, even spy on delegates conferring behind closed doors.

Important as convention business is, much of it turns out to be dismally dull—boring tallies, one by one, of 1,500 delegates; hours of overripe speeches.

The job of holding your interest belongs to the director at the control console. He must select from dozens of scenes—all showing simultaneously on monitors around him—the one to send through the air to your home. To help him, a communications network worthy of an army deployed for battle—telephones, teletypewriters, two-way radios, and plain old-fashioned runners—alert him to what's happening where.

But sometimes nothing exciting is going on. Or worse, two things are happening at once. Or most disappointing of all, the thrilling scene comes up so suddenly that it's over before the mechanics of switching it onto the air can be completed. Here, the magic of video tape, which instantly records sight and sound for telecasting later, comes to the rescue.

TV men recall sadly one frustrating incident during the Democratic convention of 1956, before tape. The cameras caught crucial by-play—one party wheel frantically signaling another—that switched votes to put a candidate right out of the race. The drama of political leaders reaching an agonizing decision vibrated from close-ups on the monitor screens. But the tense scene could not be put on the air fast enough.

In 1960, video tape will be ready to capture such historic instances so that the whole world can see. Mainly, though, tape will record interviews, informal meetings, and interesting sidelights. They will be telecast when the formal business of the convention slows to a deadly creep.

This combination of marvelous machinery, costly planning, smart presentation, and plain hard work will bring you a clearer insight into the strange process by which America chooses the man for the biggest job in the world. It may help you decide how to vote. It's sure to be fun to watch.—*Martin Mann.*



**LIGHTWEIGHT CAMERAS** take pictures for TV audience anywhere the cameraman can get to. Portable radio transmitter-receivers keep crews in touch with directors in control room.





**1. CRANE DROPS CAR** in Amero's demonstration escape. Ordinarily windows are shut, and he

carries no special equipment to help him in the stunt at the Miami Seaquarium.

## Escaping from a car that sinks under water

When a car plunges into water, one of the biggest dangers to its occupants is panic, according to Philip Amero, a Miami skin diver. Frenzied efforts to escape are a major cause of drownings.

Amero, who stages escapes at an aquarium, says that occupants should not exhaust themselves trying to force open a car door until inside and outside pressures are equalized. This occurs after a few seconds as the car fills with water.



**4. WATER PRESSURE** at first shuts door tightly. Later, trapped air may blow out glass, as here.

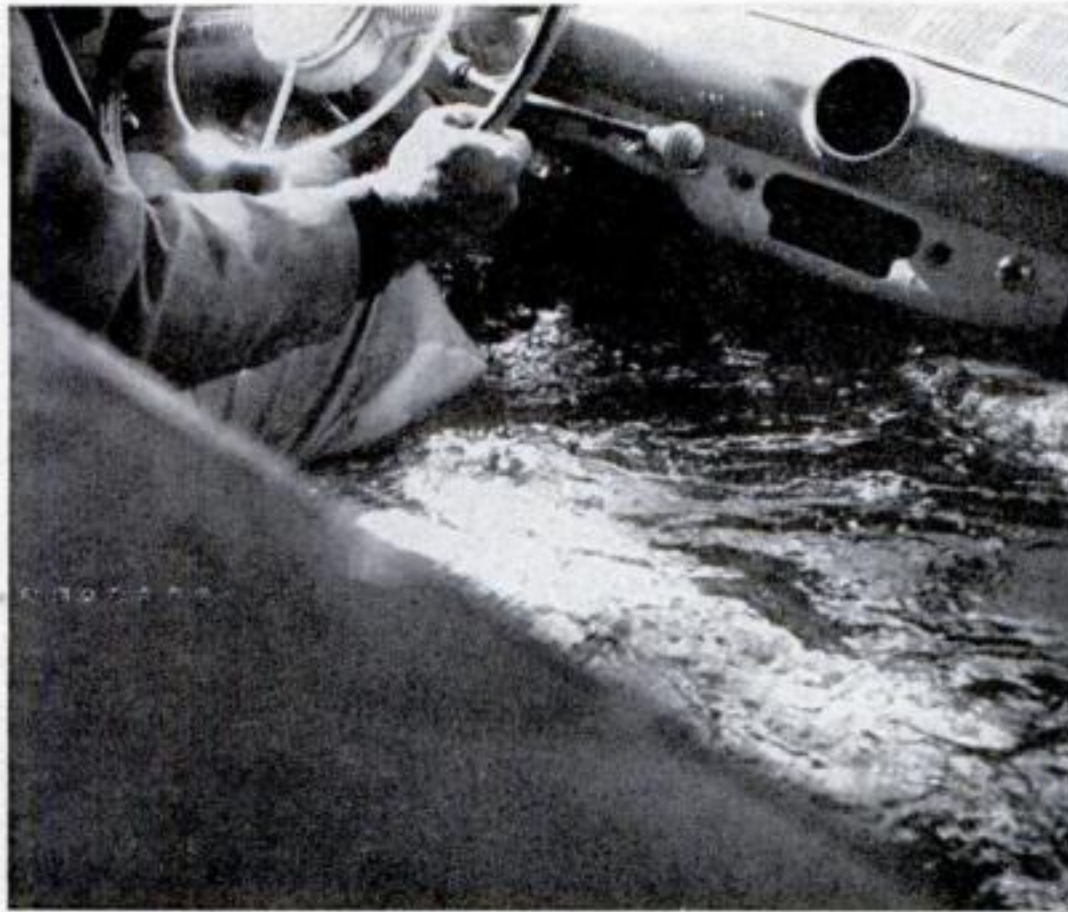


## Aircraft doctor uses X-ray

An X-ray eye is turned on both private and airline planes by engineers at the Lockheed Aircraft service base at New York International Airport.

Using newly developed mobile field equipment, they can inspect structural members, control surfaces, overlapped and multilayer sections, and critical welds—without having to lay up a plane by dismantling it.





**2. PANICKY MOMENT** is when torrent of water pours in. He advises: Grip wheel calmly.



**3. HOLDING BREATH** as water climbs over head, he waits until inside pressure equals outer.



**5. HAND ON ROOF**, Amero braces himself as he pushes out of the sunken automobile.



**6. NOW COMPLETELY FREE**, he gets clear of car. Underwater action takes place in seconds.

### Motel movies

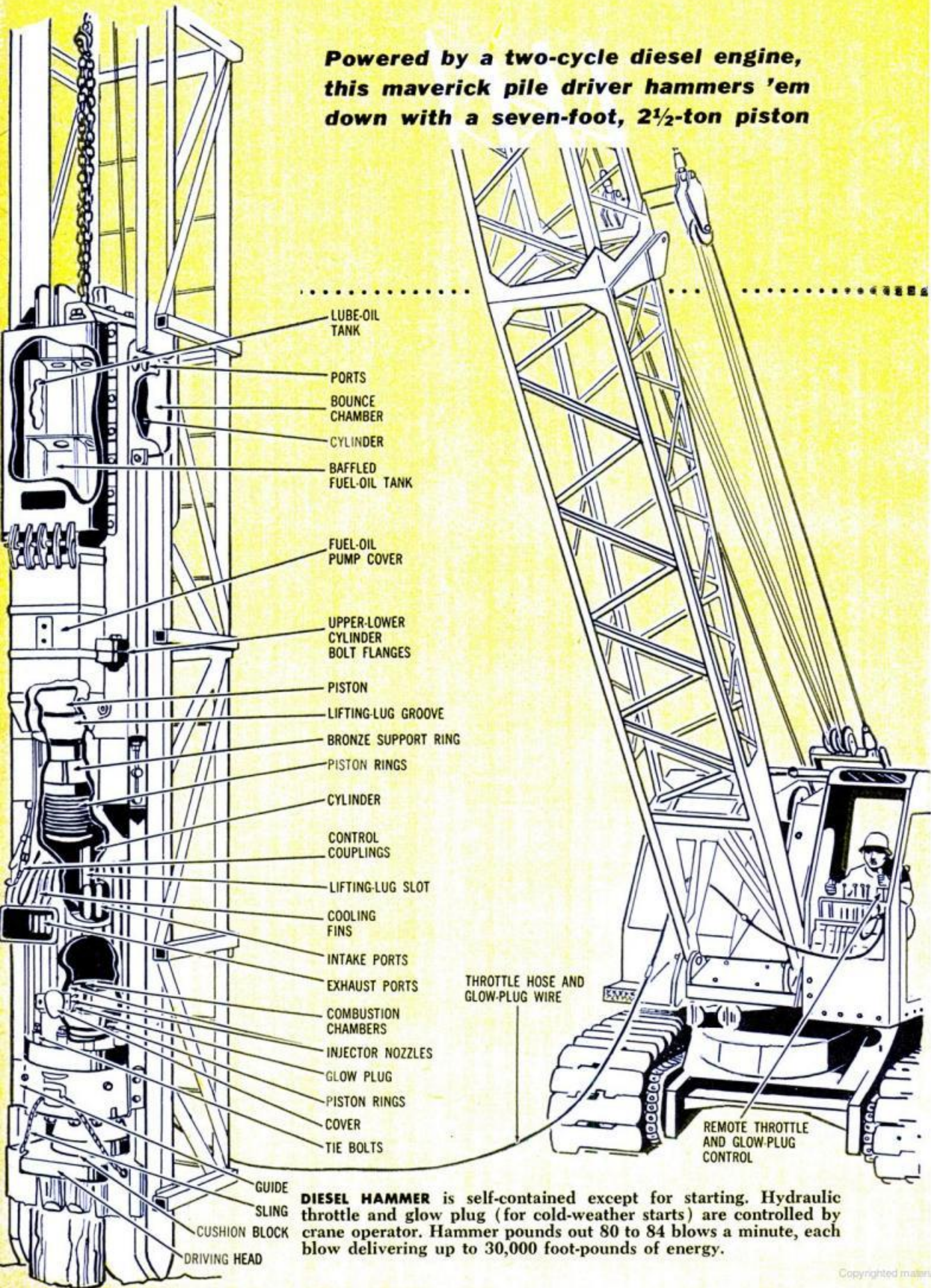
Free movie shows are thrown in when you stop at the Greenland Theatre Motel in Machias, Me.

The motel, shaped like a shallow V, overlooks a drive-in movie. A picture window in each room faces the screen, and there's a loudspeaker on the wall to bring you the sound.





**Powered by a two-cycle diesel engine, this maverick pile driver hammers 'em down with a seven-foot, 2½-ton piston**



**DIESEL HAMMER** is self-contained except for starting. Hydraulic throttle and glow plug (for cold-weather starts) are controlled by crane operator. Hammer pounds out 80 to 84 blows a minute, each blow delivering up to 30,000 foot-pounds of energy.



# Diesel Pile Driver Strikes 80 Blows a Minute



**T**HERE is a strangely different sound on construction projects these days: the metronomic “bark-bark-bark” of a new kind of pile hammer.

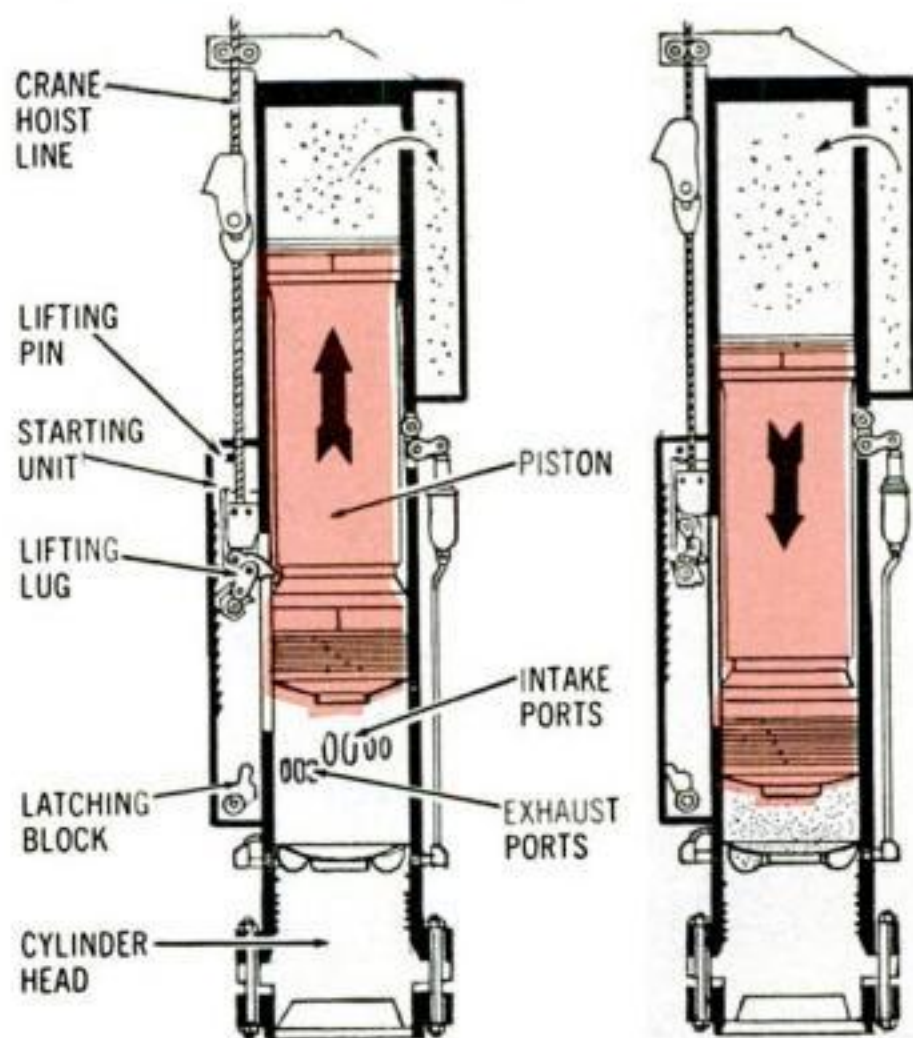
The new device is a diesel engine hammering out a challenge to steam—just as diesel over the years has challenged the right of steam to power tractors, locomotives, huge shovels, and cranes.

But this engine is diesel with a differ-

ence. The way it works is enough to drive a diesel bug mad. Its cylinder head is loose. Every time it fires, the piston hits the cylinder head. The “flywheel” is pretty much just hot air.

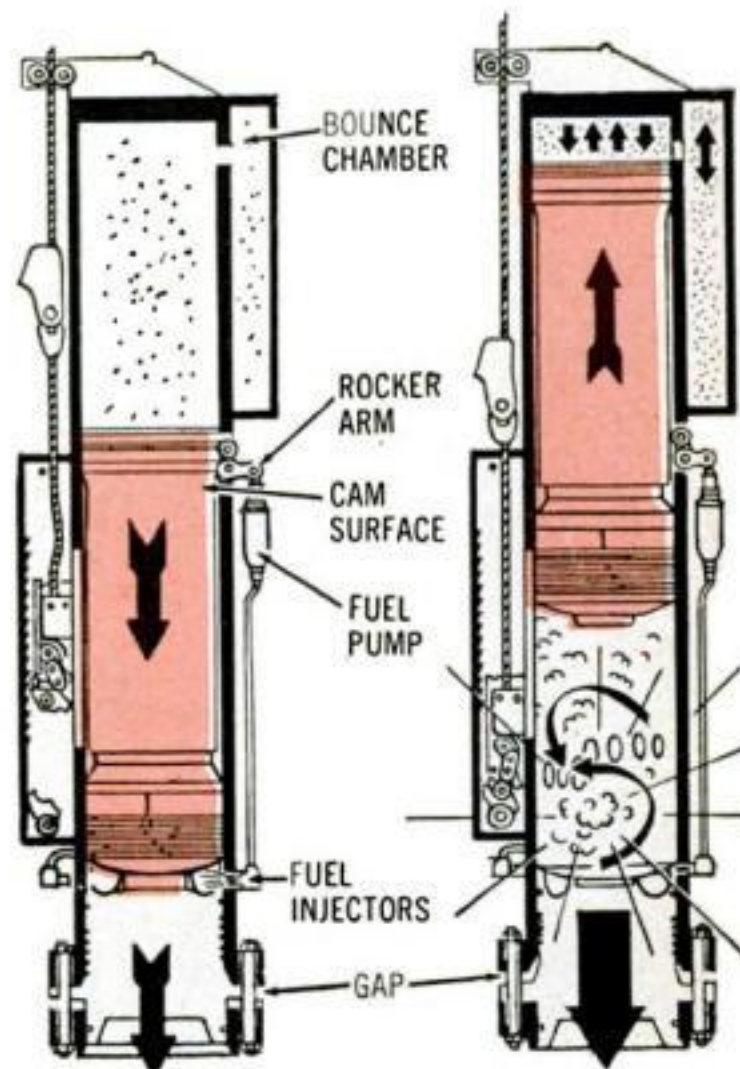
An 18-inch-diameter piston, running up and down in a 12-foot-long vertical cylinder, acts 1) as a piston to compress air until it heats up enough to ignite a charge of diesel fuel, and 2) as a huge

## How the diesel hammer works



**TO START HAMMER,** starting unit is cocked by dropping it on latching block. This exposes lifting lug, which engages groove on piston. Crane hoists piston. Entire hammer can be lifted with uncocked starting unit.

**THREE-STEP CYCLE** begins as starting unit trips, allowing piston to drop. Air—trapped as piston closes exhaust ports—compresses, preloading pile. Compression also creates heat that will explode the fuel.



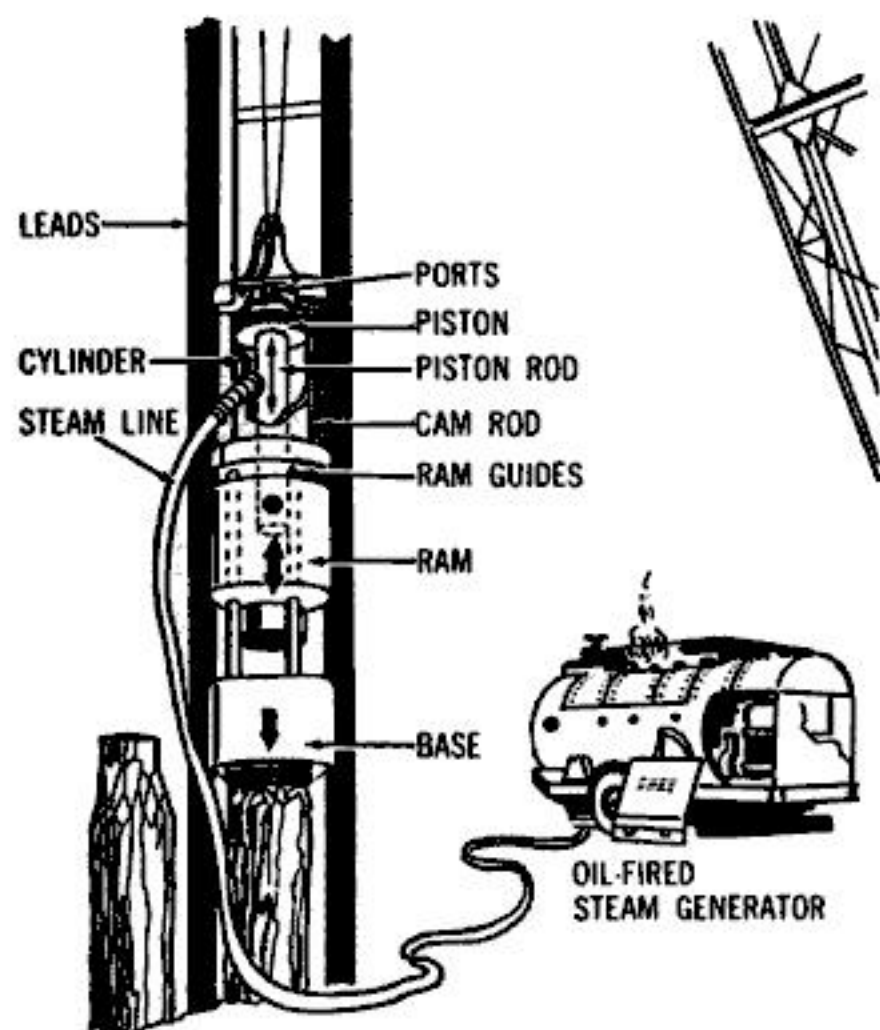
**IMPACT** when piston strikes cylinder head puts pile in motion by breaking static friction between earth and pile. At instant of impact, fuel is injected into dual combustion chambers by cam-operated pump.

**COMBUSTION ENERGY** shoots piston up cylinder, drives pile farther down. (Cylinder head is free to move about 1 1/4".) Air compressed above piston forms cushion to slow recoil and accelerate piston's return stroke.

CONTINUED



## How conventional pile hammers operate



**SINGLE-ACTING HAMMER** valves steam or air under piston to raise ram. Cam opens cylinder at top of stroke, allowing ram to drop. Both single- and double-acting hammers use steam or compressed air for their power.

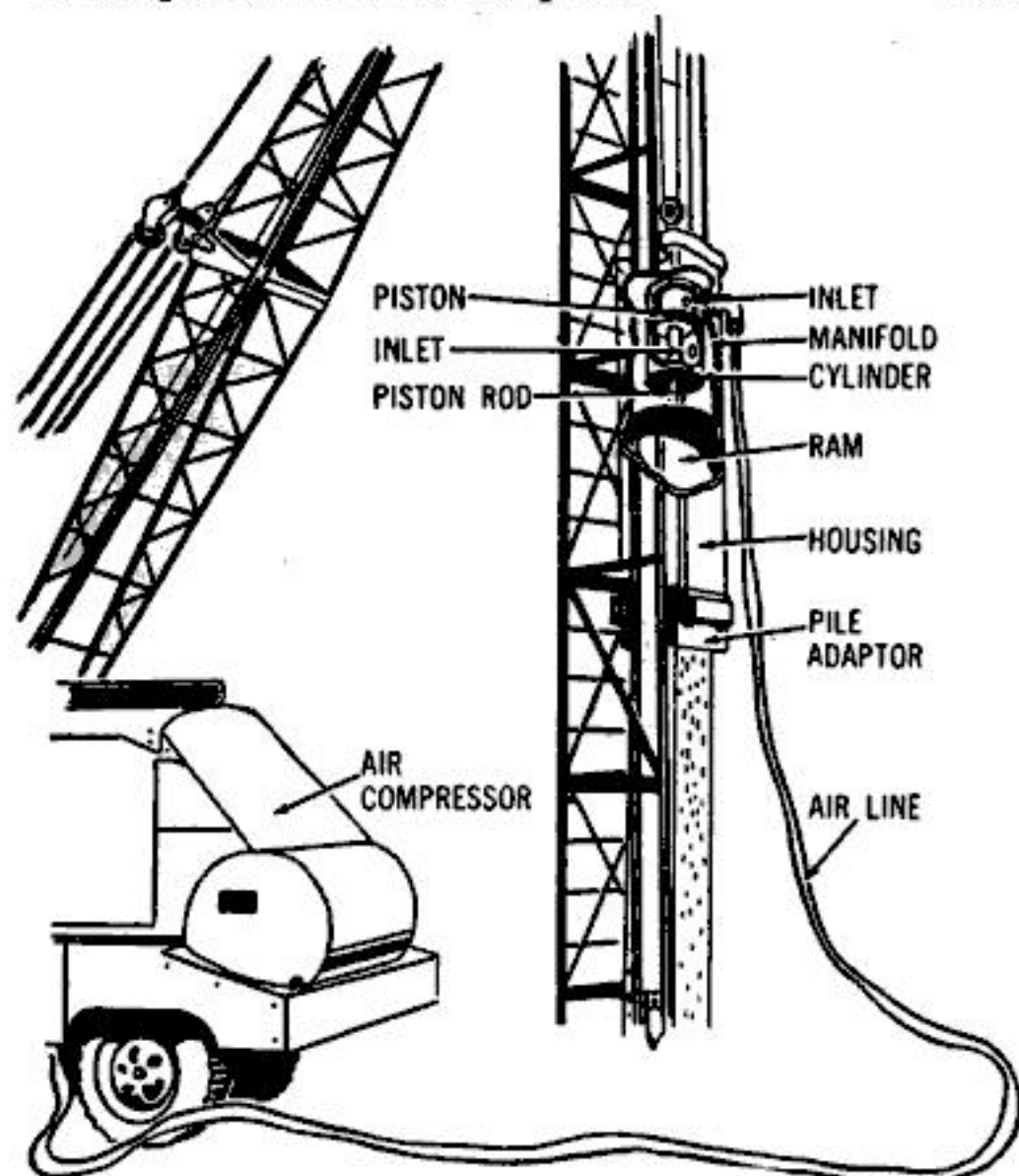
ram that strikes the cylinder head 80 to 84 times a minute.

The cylinder head doubles as an anvil that relays the tremendous blows to the pile. Combustion energy is not transmitted to a crankshaft (there is none) but to the cylinder head and piston.

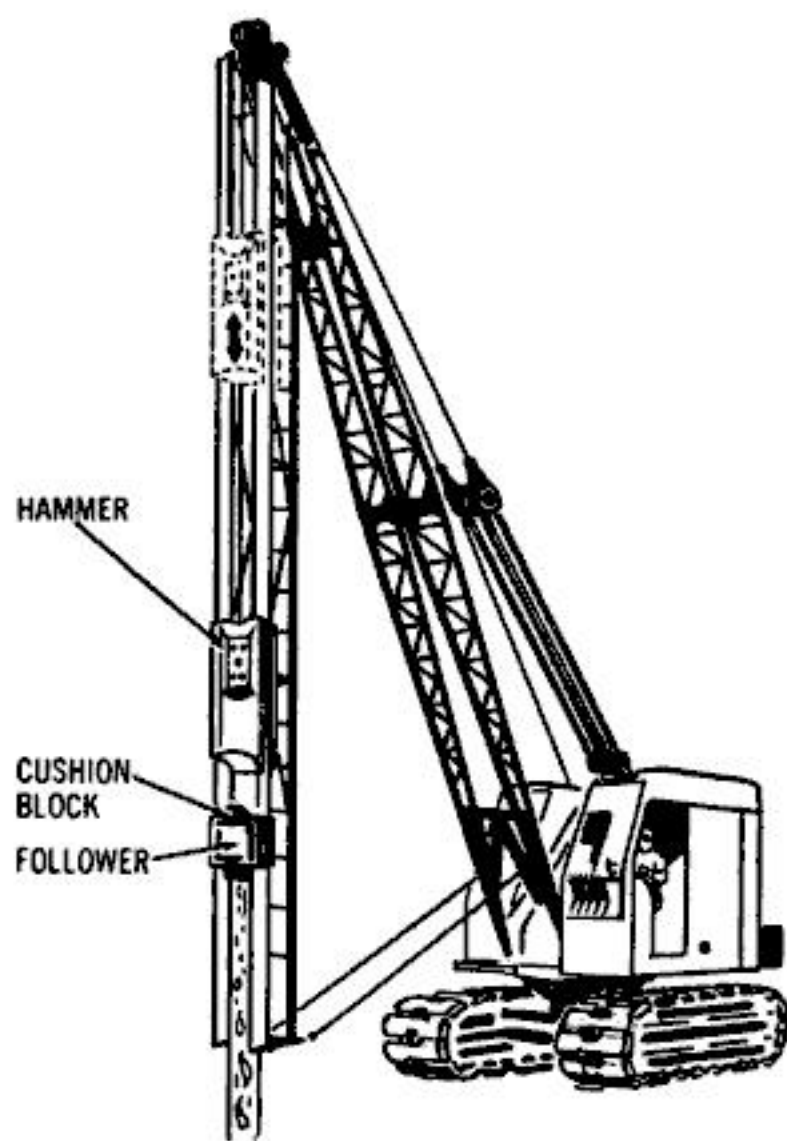
The "flywheel" is an air chamber. When the engine fires and the piston recoils up the cylinder, it compresses air in an enclosed "bounce chamber." This air cushion slows the piston at the end of its stroke and gives it a boost on the trip back down the cylinder.

To start the giant engine, the crane operator positions the unit over the pile and works a remote throttle. A man on the ground pulls a lanyard to cock the starting mechanism. The crane hoists the piston, which is dropped mechanically from the top of its stroke to begin the firing cycle. Guided by the leads, the hammer follows the pile as it inches blow by blow into the ground. Firing and shut-off are controlled by the crane operator.

Link-Belt Speeder Corp., a Cedar Rapids, Iowa, crane and shovel manufacturer, builds the unique pile hammer.—*Phil McCafferty.*



**DOUBLE-ACTING HAMMER** valves air or steam under the piston to raise ram, on top of the piston to drive ram down. Differential double-acting type uses a two-stage piston to increase speed on the upstroke.

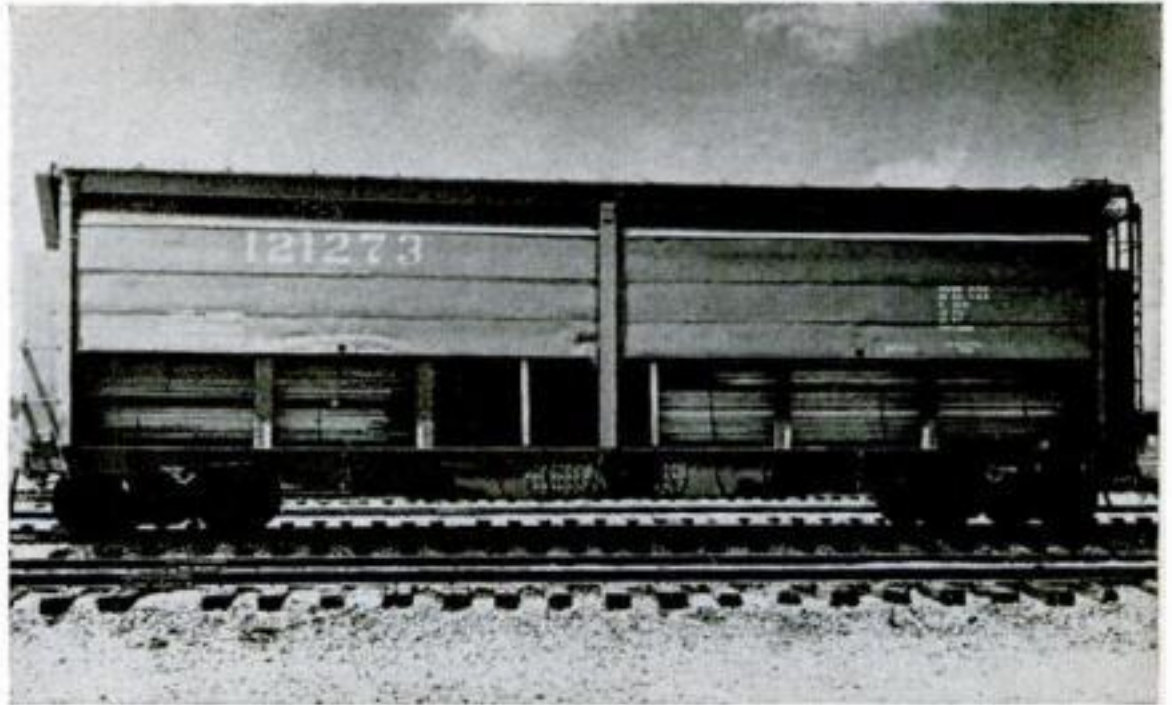


**DROP HAMMER** is simply a huge cast-iron block weighing 500 to 3,000 pounds, grooved to slide freely in vertical leads. It is hoisted and dropped by a crane.



### Roll-up doors

The lumber-hauling boxcar at right was built by Southern Railway for quick loading and unloading by fork lift. Each side consists of doors made of horizontally hinged 21-foot aluminum panels that roll into the top. The post can be removed and side stakes dropped into the floor for a full-length opening.



### Magnetic pier

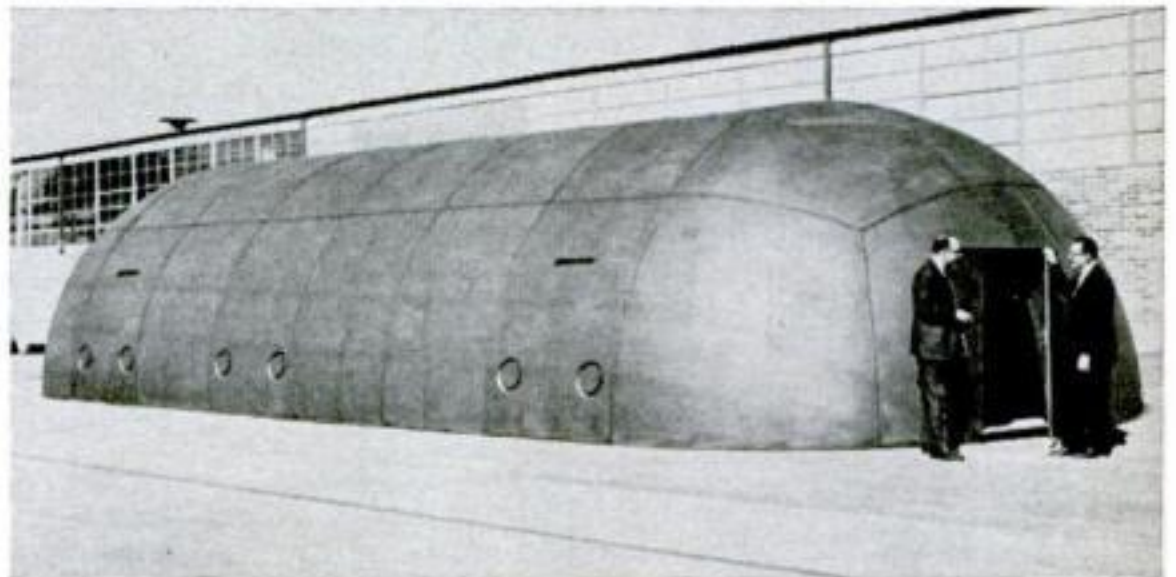
Powerful electric magnets on the side of the pier in the photo bring this excursion boat safely into port on Alster Lake at Hamburg, Germany. The magnets exert a pull of six tons on the little ship.



### Modern Quonset

Quonset huts of World War II fame have gone modern; they're being made of fiber-glass. This one, 50 feet long, serves as a Navy field-communications center.

It's assembled of interchangeable locking sections made by Specialty Electronics, Syosset, N. Y. Four men put one up in an hour—dismantle it in 10 minutes.



### Unique Corvette

An experimental Corvette is being exhibited at automobile shows. Known as the XP-700, it is just a wisp more than 48 inches high and has a transparent passenger canopy topped by a periscopic rear-view mirror. Fender air scoops give added brake cooling. It's seven inches longer than the regular Corvette but mainly uses the standard chassis.





# Mechanical Crab

## to Search Ocean Depths

**With an arm 2,000 feet long, TV-camera eyes, and a claw that can clamp onto a 2½-ton load, the giant robot Solaris is a treasure-hunter's dream come true**

**By Devon Francis**

**DRAWINGS BY BOB McCALL**



**WORKING MODEL** in photo above shows propellers for maneuvering, claw for grasping, and octopus-like body that houses electric motor to power both. Prototype will descend 650 feet, far deeper than human divers; later versions of Solaris will go down into the ocean as deep as two-fifths of a mile.

SOMETIME late this fall, a U.S. Navy boat in Puget Sound will drop overside, on a couple of cables, one of the strangest contraptions ever lowered to the ocean's depths. On its top will be a brace of propellers, at its middle a sphere, at one side a television camera flanked by lights, and on its bottom a claw.

The thing will be called Solaris. It will be the underwater treasure-hunter's dream come true.

Imagine sitting high and dry on the deck of a boat, and having at your command an arm more than 2,000 feet long to pick up whatever suited your fancy from the ocean floor—plus eyes to scan thousands of square yards of it.

Now under construction in Silver Spring, Md., for experimental torpedo recovery for the Navy, Solaris will be unmanned. In prototype, it is designed to descend to 650 feet, but it can be adapted to go down as far as two-fifths of a mile. That's 1,750 feet below the average safe working depth of a human diver.

Solaris is designed to do everything that a human diver can do, and more.

The propellers are for maneuvering. The sphere is the power unit. The TV camera gives underwater eyes to an operator aboard the launching ship. The claw is for retrieving anything that the operator wants on the ocean bottom—including sunken treasure.

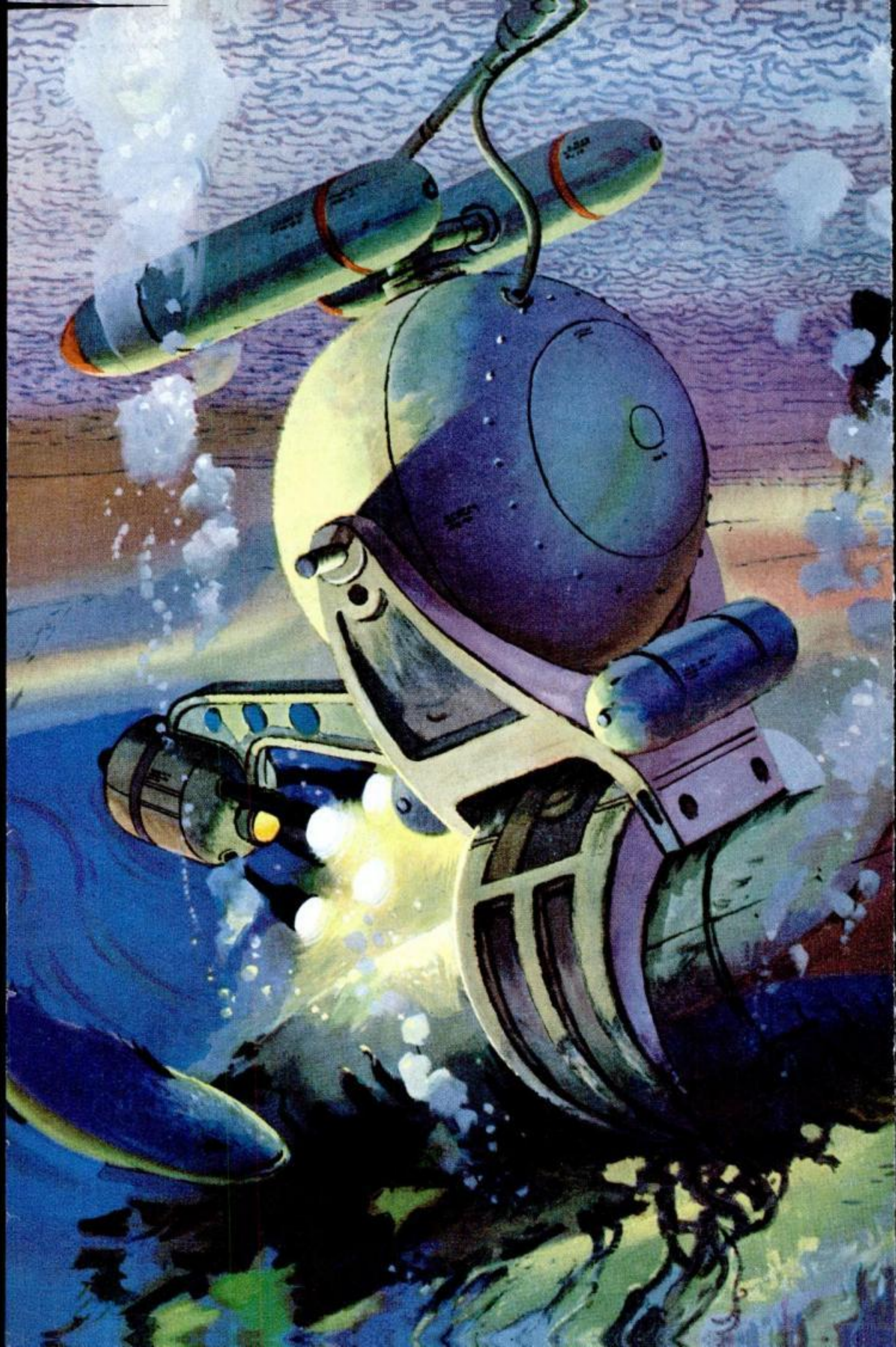
Solaris (Submerged Object Locating and Retrieving/Identification System) is versatile. It can go exploring, covering 1,400,000 square yards of ocean floor at a depth of 2,000 feet.

It can perform such prosaic tasks as inspecting channel bottoms, ship keels, bridge pilings, and submarine cables. It can clamp and bring to the surface objects weigh-

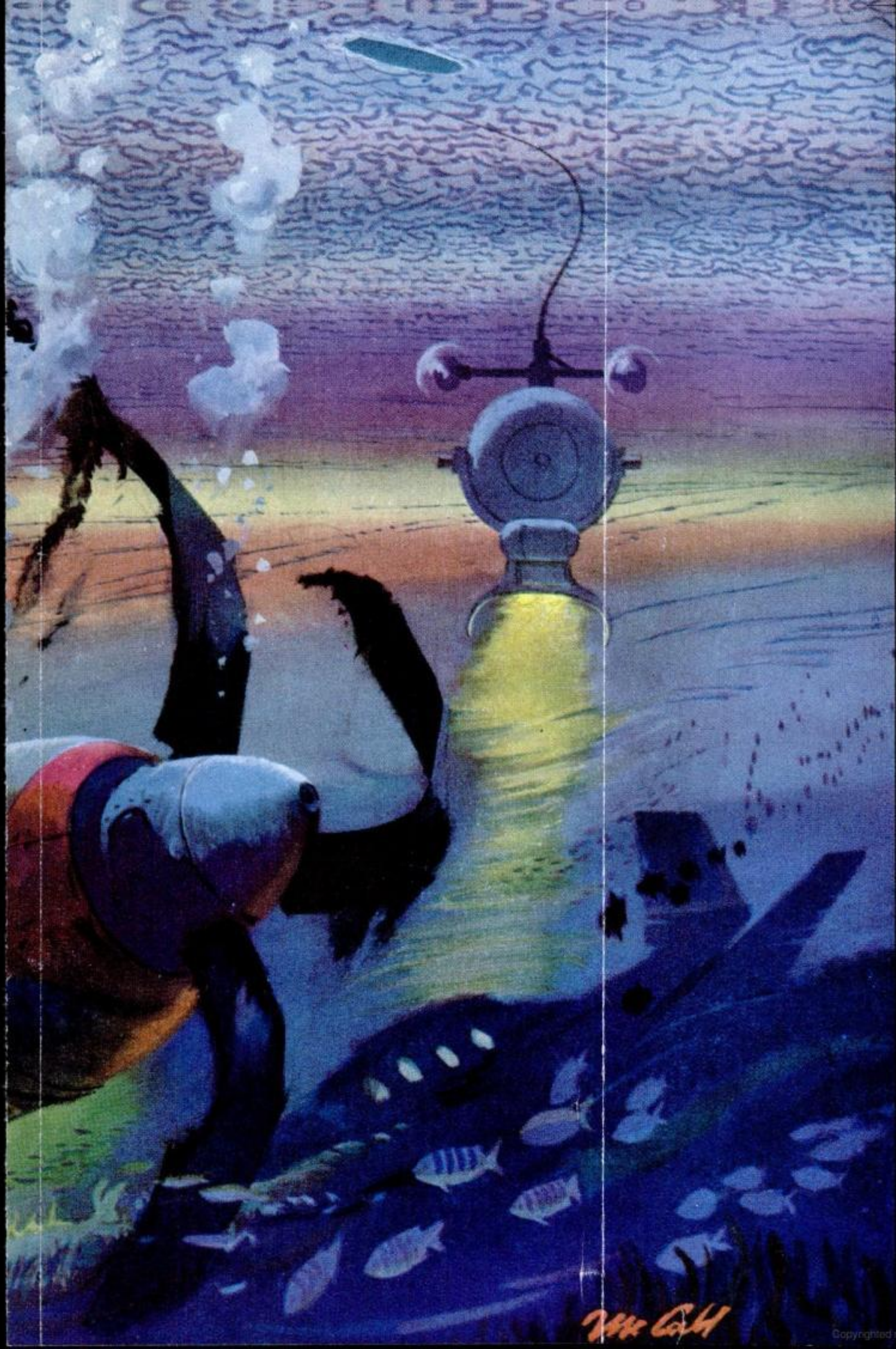
CONTINUED

**PAINTING IN FOLDOUT AT RIGHT** depicts Solaris at work salvaging a wrecked plane—one of its many possible missions. See reverse side of foldout for Solaris' various components and how the huge robot will be controlled from operator's console on the surface.





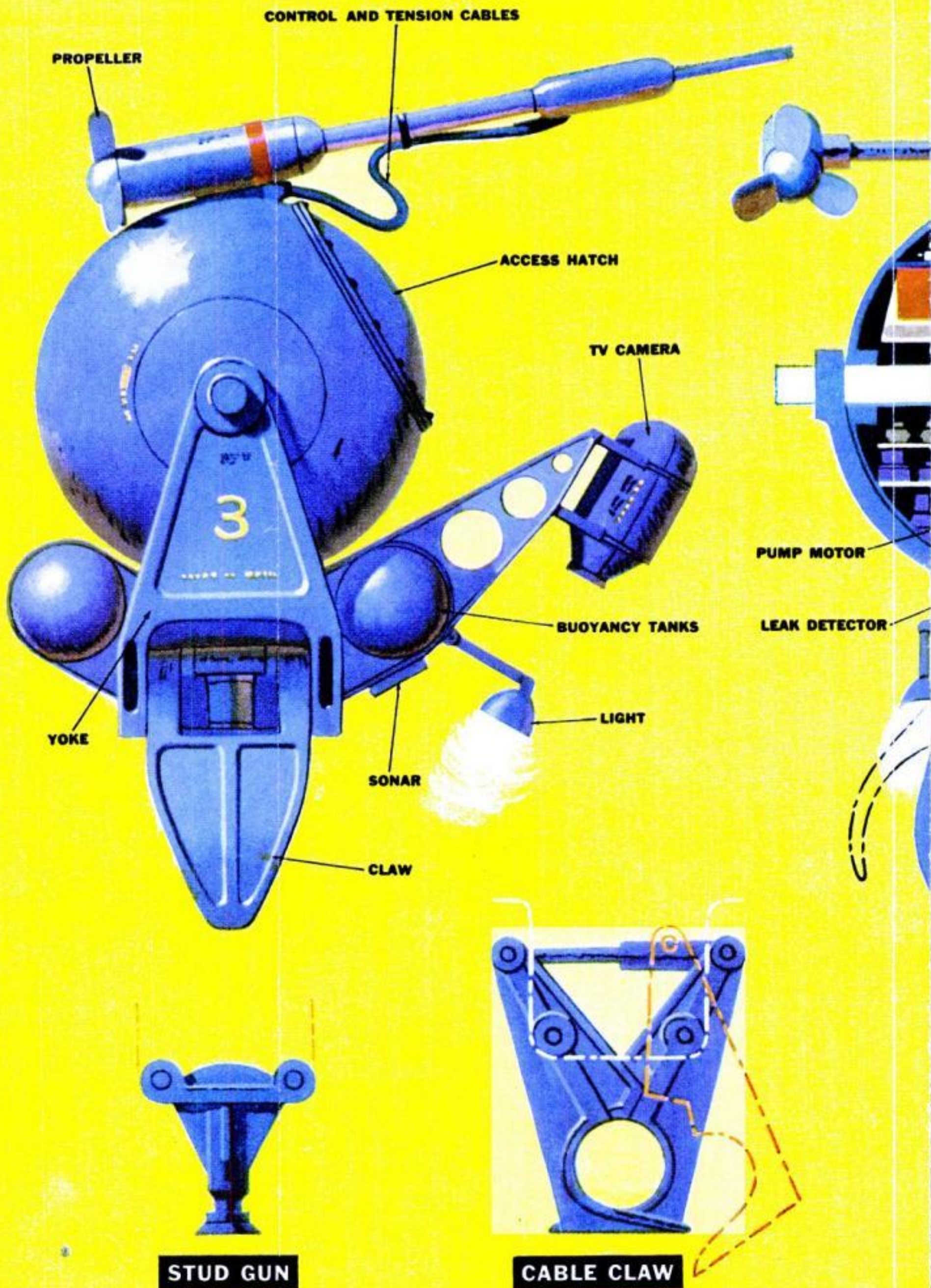




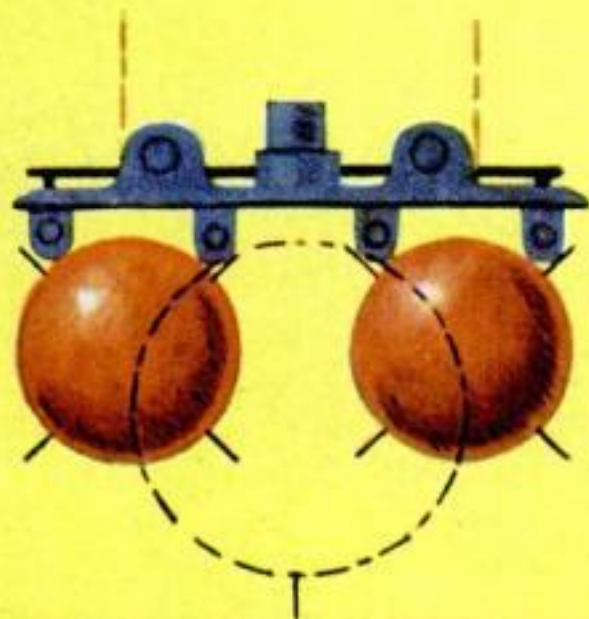
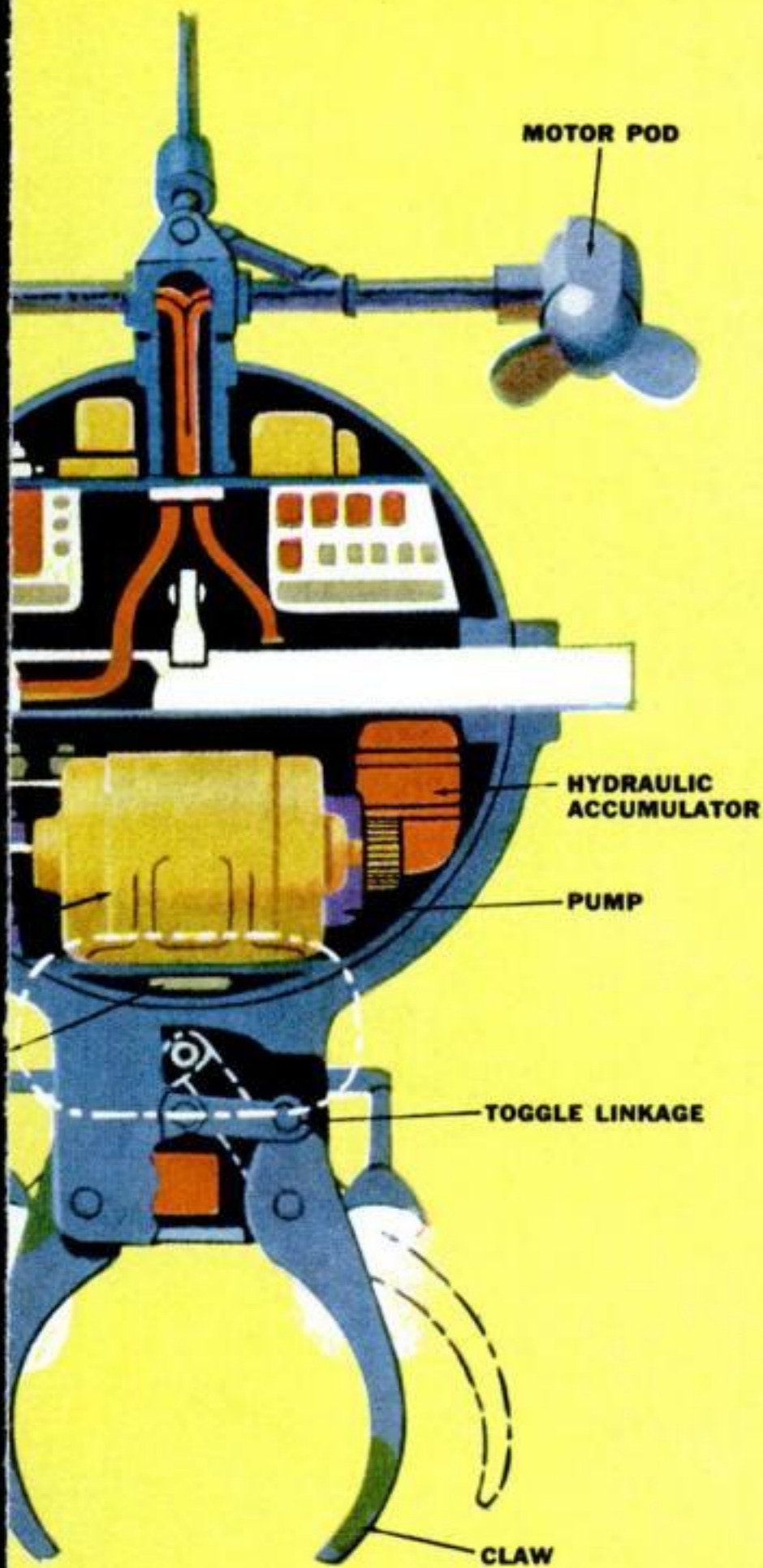
Mr. G.H.

Copyrighted material









**EXPLOSIVE-CHARGE ATTACHMENT**



**CONSOLE ON SHIP** has controls for maneuvering and claw movements. Operator uses TV image for manipulations. Instruments show vehicle heading, depth, height above bottom, claw position, propeller r.p.m., light intensity, cable paid out, and power supply.



**LOWERED INTO WATER**, Solaris is supported by cable from one drum, while electrical cable, to minimize strain on it, unreels from another. The two cables are automatically laced together by nylon cord as vehicle descends. Unlaced as they are winched back.



ing as much as 2½ tons. It can place explosive charges, and then back off and detonate them.

One of its possible uses is recovery of pieces of rockets fired from Cape Canaveral and destroyed in flight because of deviation from course. Skin divers have to do this now.

The Vitro Corp., which is building Solaris to specifications outlined by Jack Green, project engineer at the Naval Torpedo Station, Keyport, Wash., knows it can perform all these duties because a preceding device already has demonstrated it. What might be called the daddy of Solaris was developed, also, for the Navy. Its missions are classified.

One of the two cables is the lifeline of the snoopy Solaris. This cable lets it down and pulls it up. Solaris' second cable is its nervous system. Through this, the operator topside issues commands for the thing to crawlfish this way and that, to rise a bit or descend, to clamp onto a prize, to drive studs into steel plating, or to plant explosives.

The second cable also carries current for lights that illuminate the inky reaches of the deep, and it transmits the TV signals to a screen so the operator can see what he's doing.

Sitting at a console, the operator taps the second cable for information on heading, depth, height above bottom, propeller r.p.m., amount of illumination, and what Solaris' claws (or one of its substitute fitments) are up to.

That second cable, carrying the electrical lines, must be strong enough to take some tension, yet flexible enough to bend and twist while the vehicle is scrounging around on its boggle-eyed missions.

The sphere (a sort of octopus body inside Solaris' working ganglia) houses a 10-horsepower electric motor. It turns a hydraulic pump that supplies power not only for propulsion but also for the claw. To keep everything shipshape, the watertight sphere contains a leak detector and depth-measuring sonar.

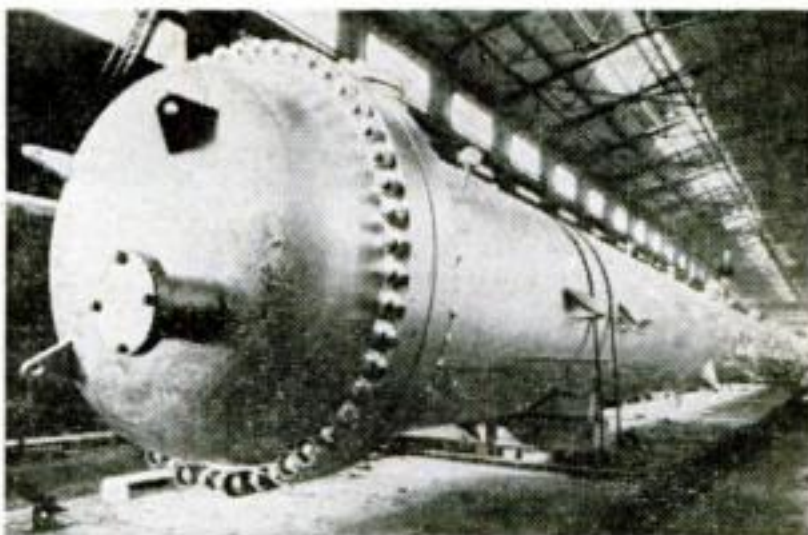
**How it works.** To maneuver the vehicle, the operator has only to turn on the propellers and vary their speed. They are driven hydraulically through gearing that is essentially like an automobile differential.

[Continued on page 218]



### Phone plays back messages

Here's a Hungarian telephone that not only records messages but plays them back if the subscriber calls from another phone—but only when he gives a code signal. The secret triggering is done with a slot in the prerecorded tape that instructs a caller to leave his message. When the subscriber utters a sound at the right point in this statement, the playback mechanism is actuated. The tape won't respond to a constant sound. It clams up completely if a would-be eavesdropper calls and makes two wrong guesses, even if his timing is correct on a third try.



### Turns ore to iron

Dispensing with a blast furnace, this huge 122-foot pressure cooker will extract iron directly from the ore. Upended, it will use hydrogen gas at high pressure and temperature to reduce the iron-oxide ore to metal—the way carbon monoxide, from burning coke, does in a blast furnace. Riding across country on a string of railroad flatcars, the 238-ton vessel is shown on its way to Bethlehem Steel's Los Angeles plant, to apply the new process.



# How Parking-Lot Gyps Operate



***Not all parking-lot guys are crooks—and they're not all honest, either. Here's how to foil the sticky-fingered ones***

**By  
M. Robert  
Beasley**

**H**AVE you ever driven from a parking lot or parking garage frowning over the bill? It was impossible—you couldn't have been parked that long?

Yet the length of time that you parked was there on your ticket in plain black-and-white. At least, it seemed to be.

There's a good chance that you were right. You hadn't parked that long. You were gypped. You were the victim of a practice known as ticket-switching. It is only one phase of the parking-lot and garage racket.

Getting exceptionally low gas mileage on your car? Some of your fuel may have been siphoned off for resale.

Getting poor tire mileage? Those shoes on your car may not be yours at all.

Battery wear out too fast? It may be a substitute.

How do the dishonest parking lots—or, as is more often the case, the dishonest attendant working for an honest owner—get away with it? That's easy . . .



## ***Take the ticket-switch, for example***

Let's say that you drive into a parking lot at two p.m. The rates are 35 cents for each half-hour or fraction thereof. Thirty minutes later you come back for your car. Your bill: 70 cents. That's funny—you've been parked only a half-hour, or thought you have. You're annoyed, but you pay.

You've been bilked. Thirty-five cents went into the attendant's own pocket. Instead of giving you a fresh ticket stamped at two p.m., he gave you a ticket that he had issued to another motorist who drove in at 1:30 and drove out at 1:55. You failed to notice the time stamp. The attendant is in the clear on the lot owner's time clock—besides his personal profit, he has 35 cents to turn in for the half-hour's parking registered on the clock.

Why do you pay? Because you won't make a scene for 35 cents, and the attendant knows it.

You can protect yourself from this particular deceit by marking your own time on the back of the stub—and your mileage. Let the attendant see you do it—in fact, ask him for the time. He will omit your car from the ones marked for a fast shuffle.



*One way to protect yourself: Mark mileage and time on your parking ticket.*

## ***Then there's the gas-gauge racket***

It's even easier than the ticket switch. All the attendant has to do is park your car where the back end is hidden, start a siphon into a five-gallon can, and walk off. He's sharp. He knows how long it will take to fill the can. He has checked your gauge. He knows he can drain off five gallons without your becoming suspicious.

This dodge is particularly lucrative where parking lots or garages offer gas and oil services. The man who tells the attendant, "Fill 'er up while I'm gone," gets gas from your tank. The proceeds are clear profit for the attendant.

Sometimes the thieves—because thieves they are—take only a couple of gallons from each of several cars, but they do it with deadly regularity, day after day.

"Don't buy a Buzzard V-8 like mine," victims tell their friends. "It's a gas hog."

You can foil such thieves. Install a lock cap on your tank—and keep the key in your pocket. A good check on tank-tampering is to put a grease-pencil mark on the glass covering your gauge when you park. The pencil mark is removed easily afterward with a piece of tissue.



*The thieves may take only a couple of gallons from each car, but they do it with deadly regularity, day after day.*



## Accessory-stealing really pays off

Usually the switching of tires, batteries, and even radios and heaters is confined to "transient" cars, particularly those with out-of-state plates. The attendant with sticky fingers parks his own car on the lot where he works. His trunk is loaded with worn-out replacements for what he wants to steal.



*Not one motorist in a hundred can identify his own battery or tires. Could you?*

A standard practice at many lots is to ask how long you intend to be, "so we'll know whether to keep your car handy." This can be a perfectly legitimate question—the lot wants to keep the short-stay cars in front. But it can also open the door to larceny. It takes a little time to strip a car.

Switching a battery is almost fool-proof. The worn one put in the place of yours has enough charge to give you several days of driving. There are countless cases where entire sets of new tires

have been replaced with worn ones having re-cut treads. You don't know you've been robbed until the casings, weakened by the cutting, begin giving you trouble.

The tire-and-battery racket flourishes because not one motorist in a hundred can identify his battery or tires. Could you?

Often, spare tires are just stolen outright. Attendants are reasonably sure the customer won't check the trunk before driving away. Once he's gone, pinpointing the time and place of such a theft is almost impossible.

## The crooks love it when you leave your keys



*If you must leave the ignition key, DON'T leave others with it.*

You yourself make your car easier to "work" if you leave your key in the ignition. You compound your carelessness if you keep all your keys in the same case with your ignition key.

Thief-attendants like to move a car to an isolated corner of the lot or garage. They have an approach to you if you're the type who likes to lock up his car—the lot rules permitting.

As one veteran thief, who has made a plush living from parking lots for 20 years, explains it: "If I spot a car that I want to work on, I don't give the sucker a chance to think of locking up. As he pulls in, I yank open the door, help

[\[Continued on page 224\]](#)

## 7 Quick Tips on Parking

You can give yourself reasonable protection while parking if you remember and practice a few simple precautions. Make a check list of the following suggestions and paste them on the visor.

1. When parking, don't tell attendants how long you will be gone, unless it is a very short time.

2. Mark the back of your ticket with arrival time and your mileage.

3. Have a gas cap with lock, and keep the key in your pocket.

4. Wherever possible, park the car yourself and lock it, retaining possession of the key.

5. Where the key must be left in the car, leave the ignition key only.

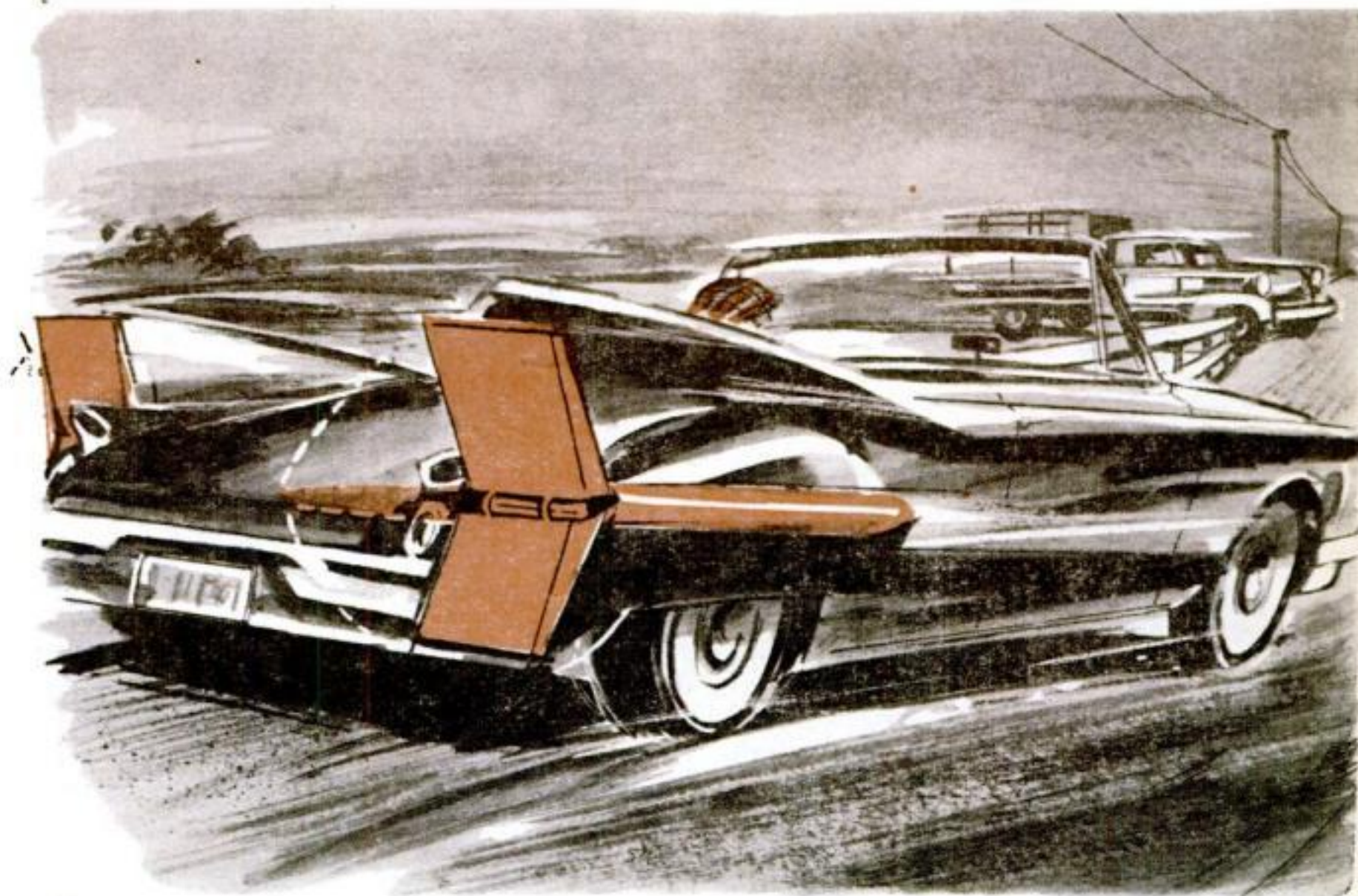
6. Always lock the glove compartment. Don't leave valuables in the car where they can be seen.

7. Have your car serviced only where you know the management and employees.



# New Ideas from the Inventors

.....

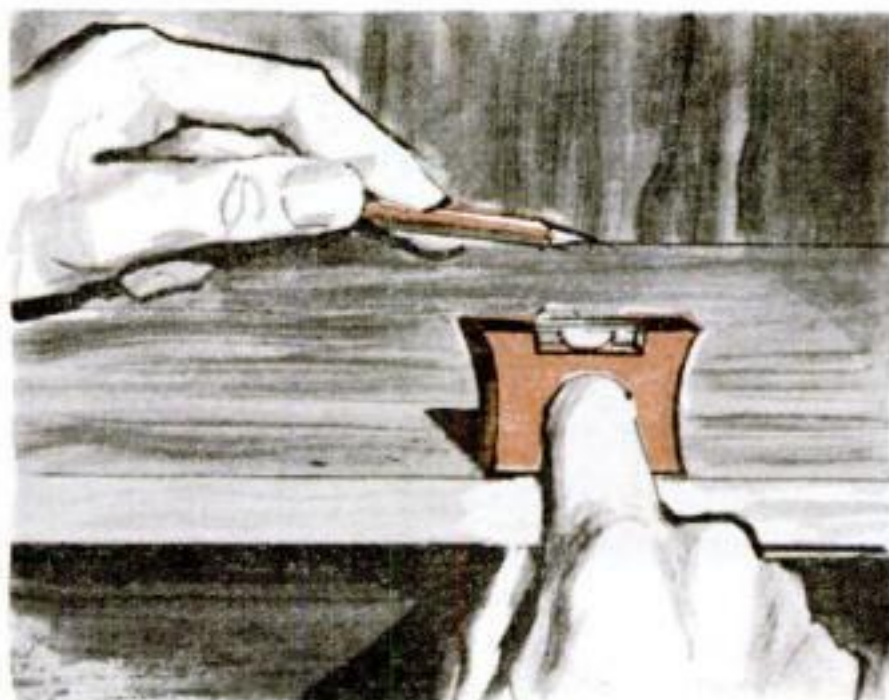


**Fins Help Brake Car.** Wheel brakes alone, according to this recent GM patent, won't be adequate for near-future cars cruising at 100 m.p.h. or more. But

by disrupting an auto's streamlines—and thus increasing air drag—these spreadable fins would slow a car to where its wheel brakes could take over.

**Ring Keeps Level on Hand.** You wouldn't have to grope for your spirit level if it were built into a square-bottomed finger ring like this. The wearable bubble would not only be handy for frequent checks, but could also be held by the same hand that grips or guides the work.

**Vacuum Lifts Hair for Trim.** With this suction nozzle attached to his clipper, a barber could shape hair for a brush trim regardless of its natural fall. Guided by an adjustable frame strapped to the head, the clipper would cut the lifted hair on a straight-across line.





## More Inventors' Ideas



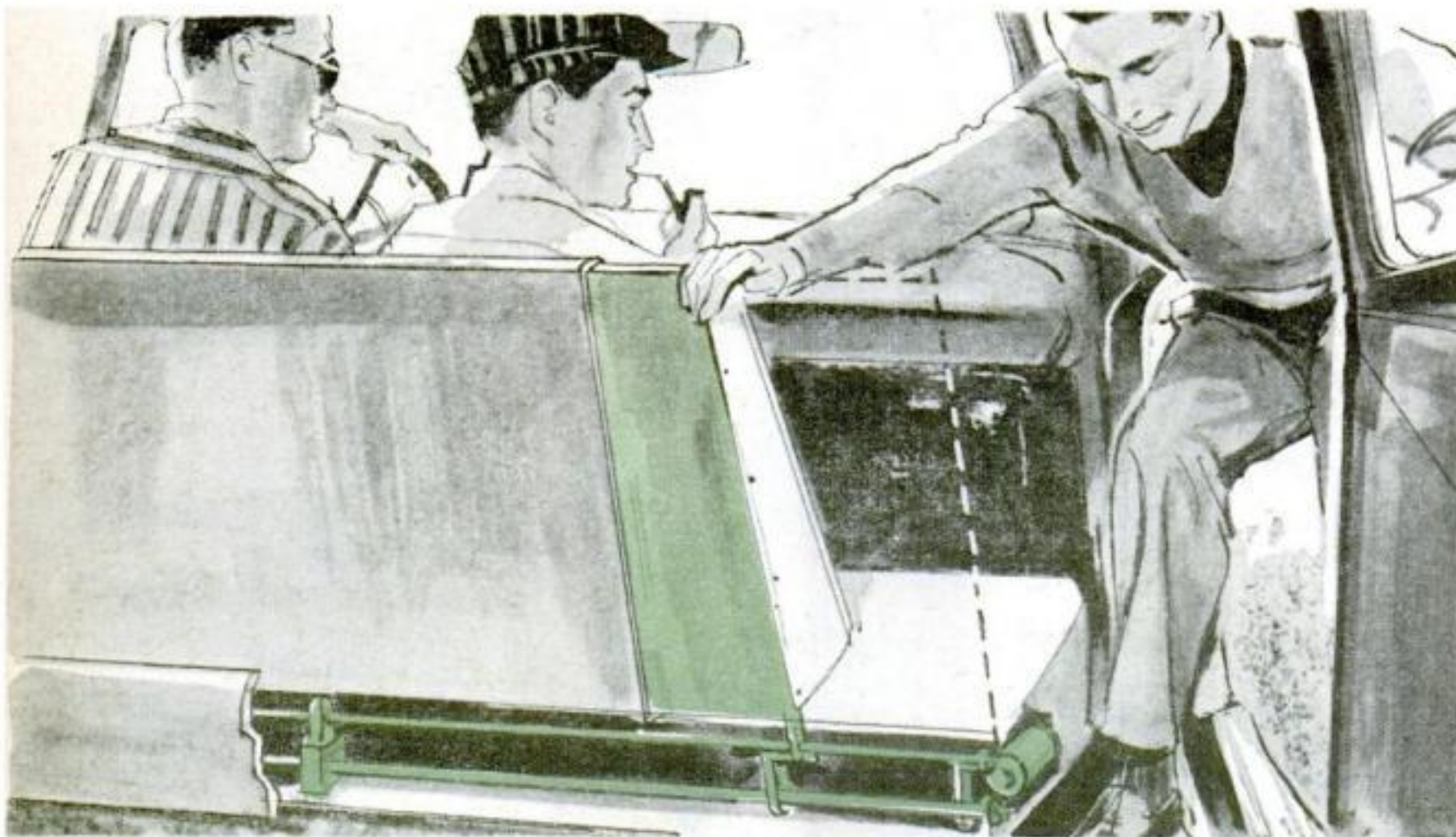
**Golf-Club Tip Retrieves Balls.** Attached to the handle end of a club, spring-metal fingers would let a golfer retrieve a ball from a cup, sand trap, or other hard-to-reach spot without stooping. A quick-lock socket on the gripper would slip on or off a club handle.



**Magnets Speed Cowboy's Draw.** A young gun toter could start throwing lead faster if he wore his weapon on this steel holster. Two magnets in the gun would grip the plate but allow a quick, no-fumble draw. A stop on the plate would keep the gun from sliding down.

**No-Tip Seat Slides for Entry.** Hinged front seats of two-door cars can be dangerous when sudden—or crash—stops throw rear-seat riders forward. This

safety seat would slide inward for convenient rear-seat access. Frame members would telescope; a small motor might be used to compress foam-rubber padding.

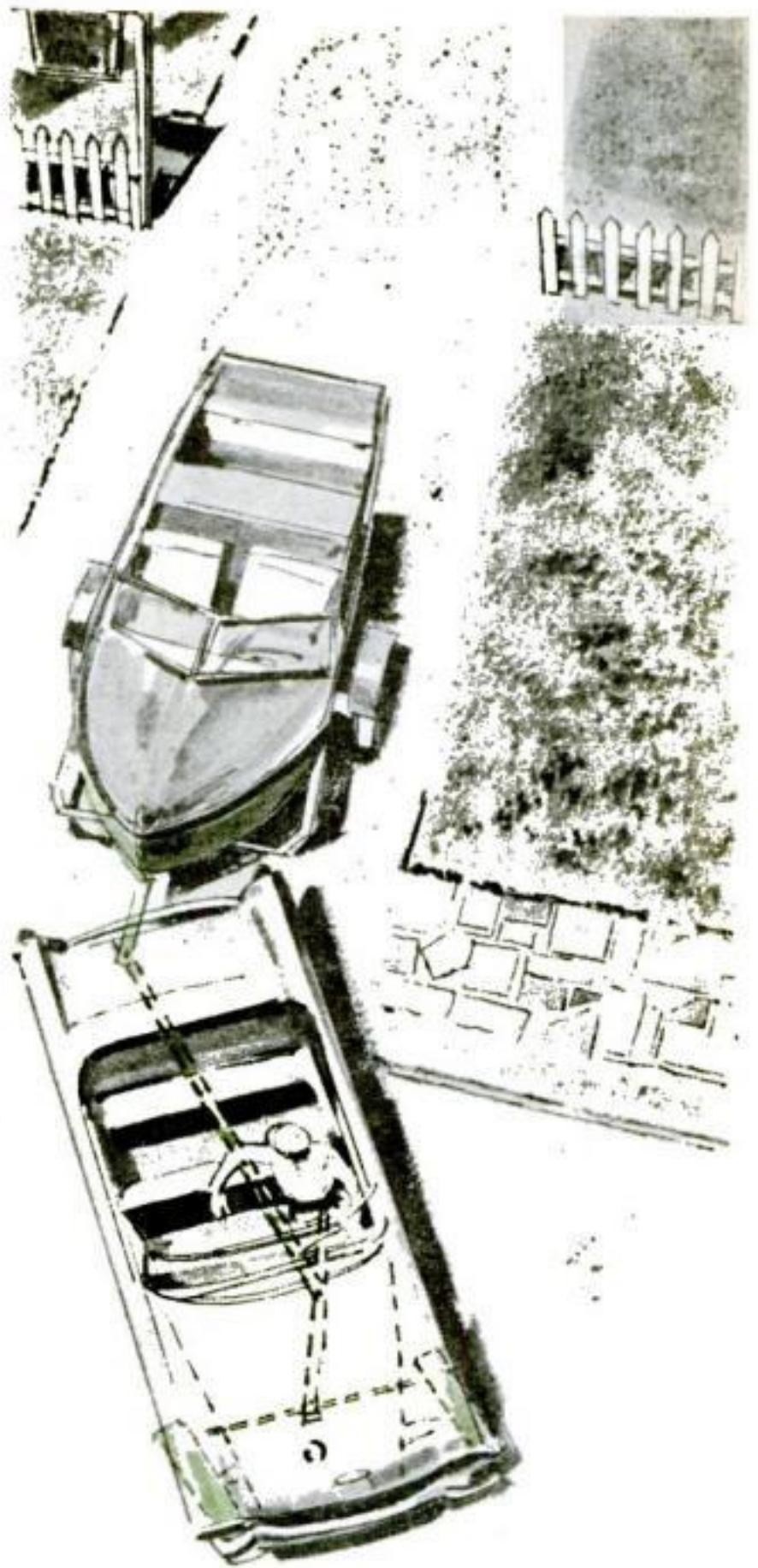
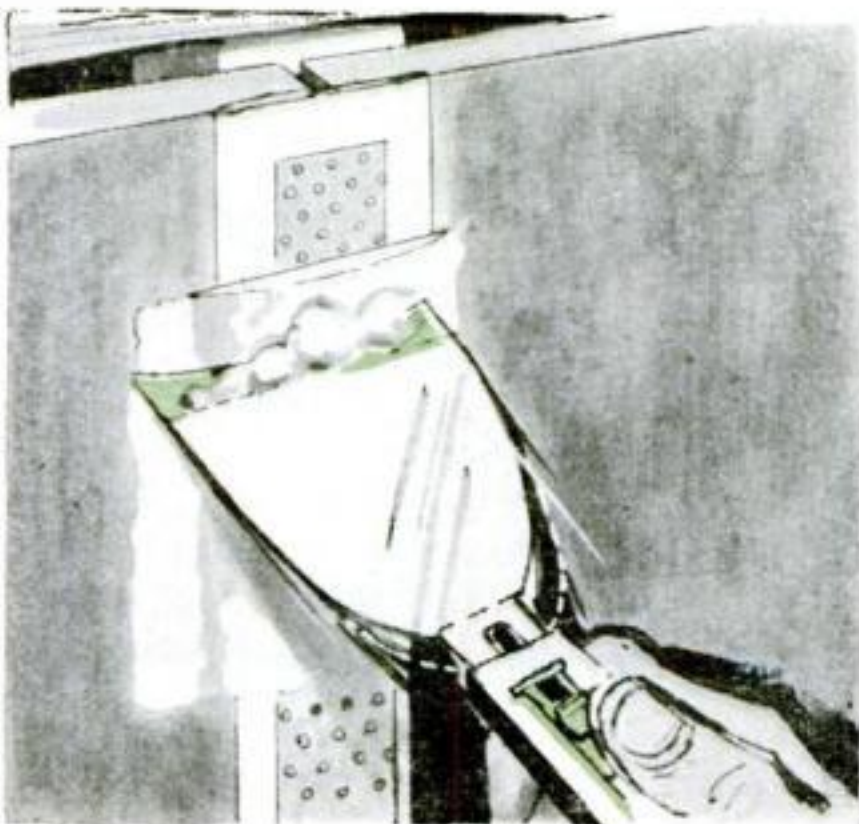






**Wired Belt Demands to Be Used.** A car with this seat belt couldn't start if a driver or passenger neglected to strap himself in. Wires in series with the ignition switch would be laced through each belt. To close circuit, each buckle prong would have to touch a recessed eyelet.

**Two-Blade Knife Shapes Plaster.** The combination of a fixed and slidable blade on this plastering tool would let you manipulate the filler and shape it to the work. You could use either the straight-edged blade, or advance the slightly concave one, to form flat or rounded joints, fill gaps between wallboard edges, or feather the margins of a fill.



**Hitch Backs and Steers Trailer.** Maneuvering a small trailer around corners or in reverse might be simplified by this steerable hitch. With its forward arm clamped to the tie rod, turning the car wheels would angle the pivoted follower arm and steer the trailer. Bent under-car parts would clear transmission dips.

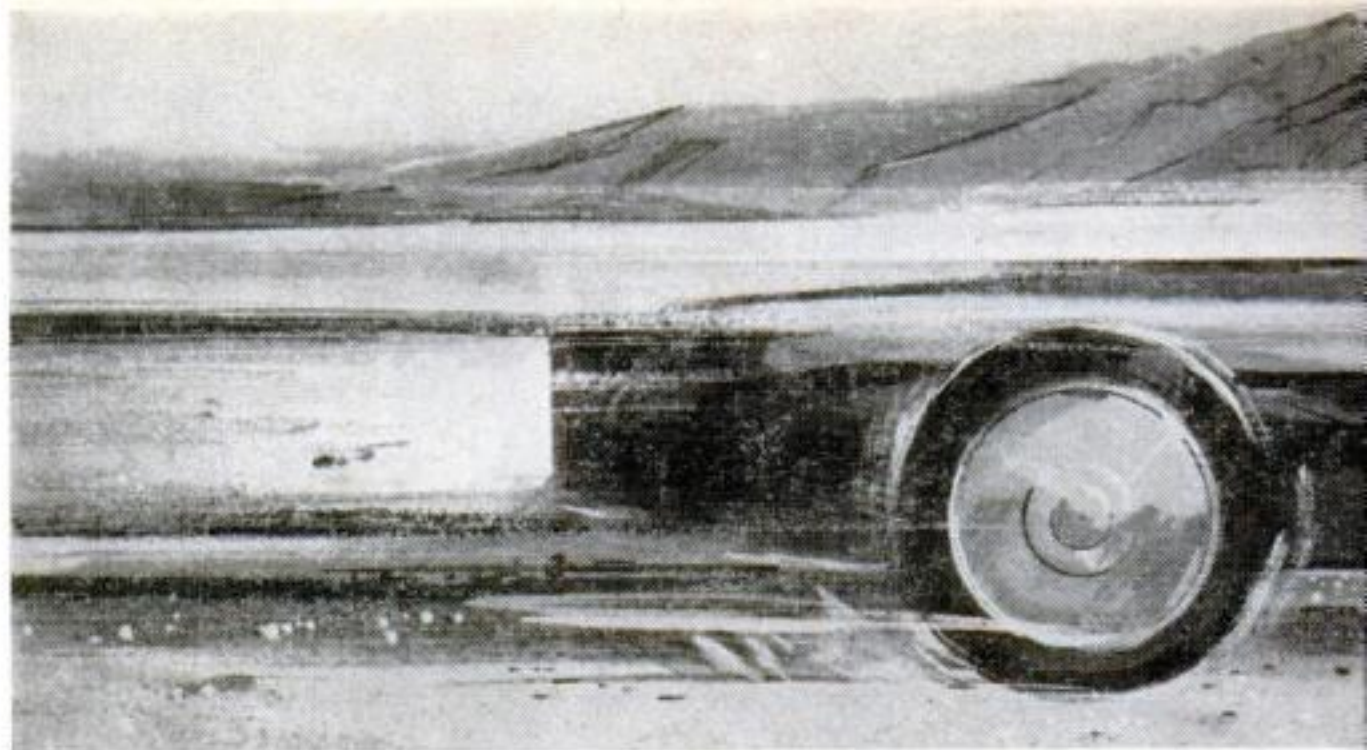
*The following patents have been issued on these inventions:* **Brake fins**—No. 2,797,951 to R. McLean, Oak Park, and R. Schilling, Bloomfield Hills, Mich.; **Level**—No. D. 130,624 to E. Souter, Moss Beach, Calif.; **Hair trimmer**—No. 2,915,070 to W. Benson, Rudd, Iowa; **Club tip**—No. 2,301,375 to J. McEvoy, San Francisco; **Holster**—No. 2,910,304 to W. White, Tulsa, Okla.; **Slide seat**—No. 2,800,947 to R. Thiem, Seattle, Wash.; **Wired belt**—No. 2,802,073 to F. Simon, Litcher, La.; **Plaster knife**—No. 2,800,672 to J. Gilyan, Gary, Ind.; **Hitch**—No. 2,913,256 to P. Sharpe, Rockport, Me.;

Copies of patents may be ordered, by number, from the Commissioner of Patents, Washington 25, D.C., at 25 cents each (10 cents for D, or Design, patents). To write to an inventor, if the address given above is insufficient, you may address him (by name and patent number) in care of the Commissioner of Patents.





**DOCTOR-DRIVER** Nathan Ostich holds model of car. It is jet-propelled—no gears to wheels.



## Jet Car Aims at 500-

***This bomber engine on wheels may clobber the 394-m.p.h. land-speed mark set in 1947***

**A** LOS ANGELES surgeon who is a speed demon on the side, Dr. Nathan Ostich, will climb into his revolutionary 6,000-pound Flying Caduceus this summer and blast off across the glaring salt flats of Bonneville, Utah. Blast off is right. This car is jet-propelled.

In his sleek, streamlined monster, two-thirds of which is engine, the racing medico hopes to shatter the late John Cobb's record of 394.2 miles per hour, and set a new land mark of at least 500 m.p.h.—or maybe even 600.

"Piston engines," he says, "have about reached their peak."

The first man to race on Bonneville's salt track, Teddy Tetzloff, hit the dazzling mark (for 1914) of 147 m.p.h. Twenty-one years later, Sir Malcolm Campbell clocked 301.13. The British were on their way. In 1937, Capt. George Eyston made 311.42, raised it to 357.5 the following year. And in 1947 John Cobb set the record that still endures—394.2 (403 m.p.h. on one run).

**Fast company.** Dr. Ostich, a craggy-faced 50-year-old bachelor, is an old hand at Bonneville, holding several class records (his best: 189.98 m.p.h. with a Chrysler-engined Henry J). This year he'll have dangerous company. Hot-rod artist Mickey Thompson will be there with his revamped four-Pontiac-engined

job. And Britain's Donald Campbell, the water-speed champion, will bring over a Bluebird powered by a gas turbine of the type used in Britannia turboprop airliners.

But nothing like the Flying Caduceus has been seen in Bonneville's 46 blazing years. It is a long, aluminum-skinned assembly of seamless tubing with a wheel-base of 12½ feet. The engine, a GE turbojet J-47 (from a B-36 bomber), weighs 2,350 pounds and develops 5,200 pounds of thrust, and nearly 7,000 hp. at 500 m.p.h.

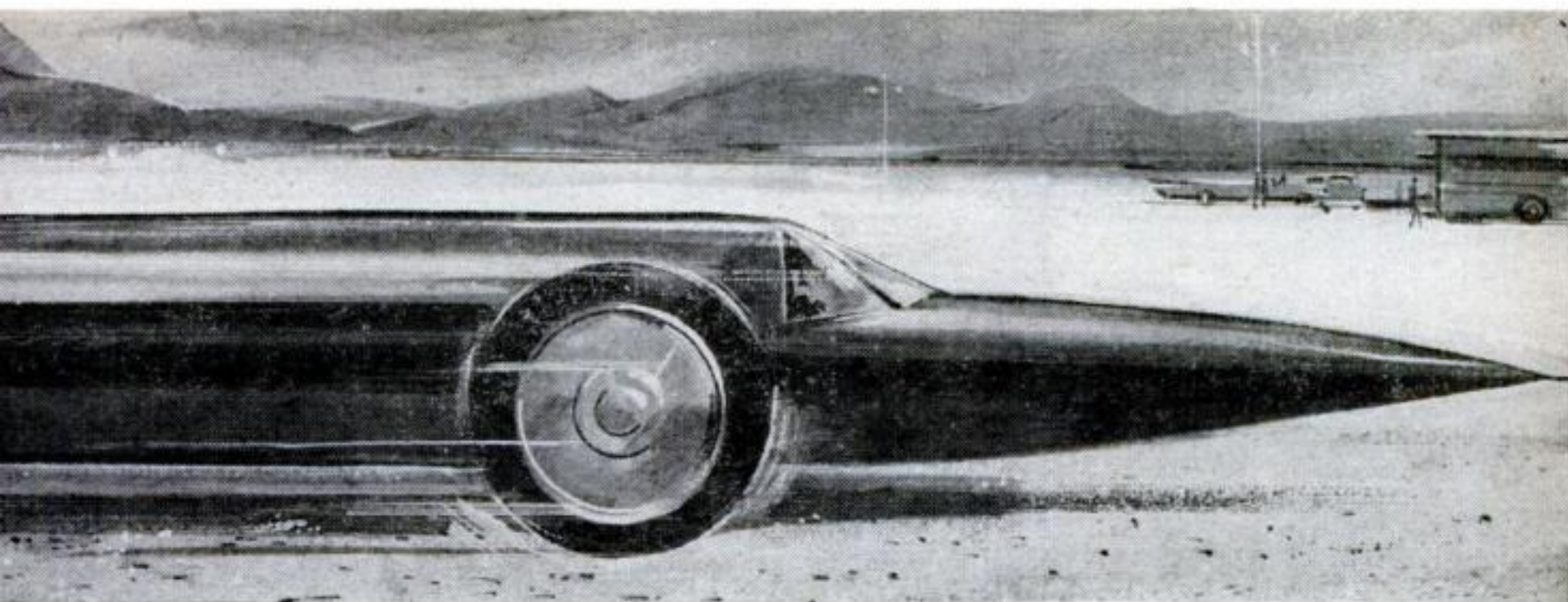
It gulps 15 gallons of JP-4 fuel a minute, but fuel storage is no problem because a single run will require only seconds. The 40-gallon tank is big enough. The car should reach 500 m.p.h. in 42½ seconds.

The driver sits just ahead of the engine, with thick bulletproof glass shielding his face against the vicious air blast. The instrument panel holds gauges showing engine temperature, air speed, fuel consumption. Two-way radio will report unforeseen trouble, such as a tail fire.

**Braking from 500 m.p.h.** To stop at the end of his run, Dr. Ostich will kill power and coast until the car is loafing at 300. Then he will eject a ribbon-type drag chute to slow to 176. After that he can ease on the four-wheel disk brakes.

The 500-mile-an-hour car is the result of two years of development and research involving a whole battery of engineers. Ray Brock, technical editor of *Hot Rod Magazine* designed it, but backing him





## M.P.H. Record

up were veteran racer Ak Miller; air-duct engineer A. C. Sterling; scientists at California Polytechnic College (who ran wind-tunnel tests and electronic-computer calculations); and a group of men, headed by Bill Rowan, from Firestone Missile Division. Firestone Tire designed and manufactured the wheels and tires—critical components for such speeds.

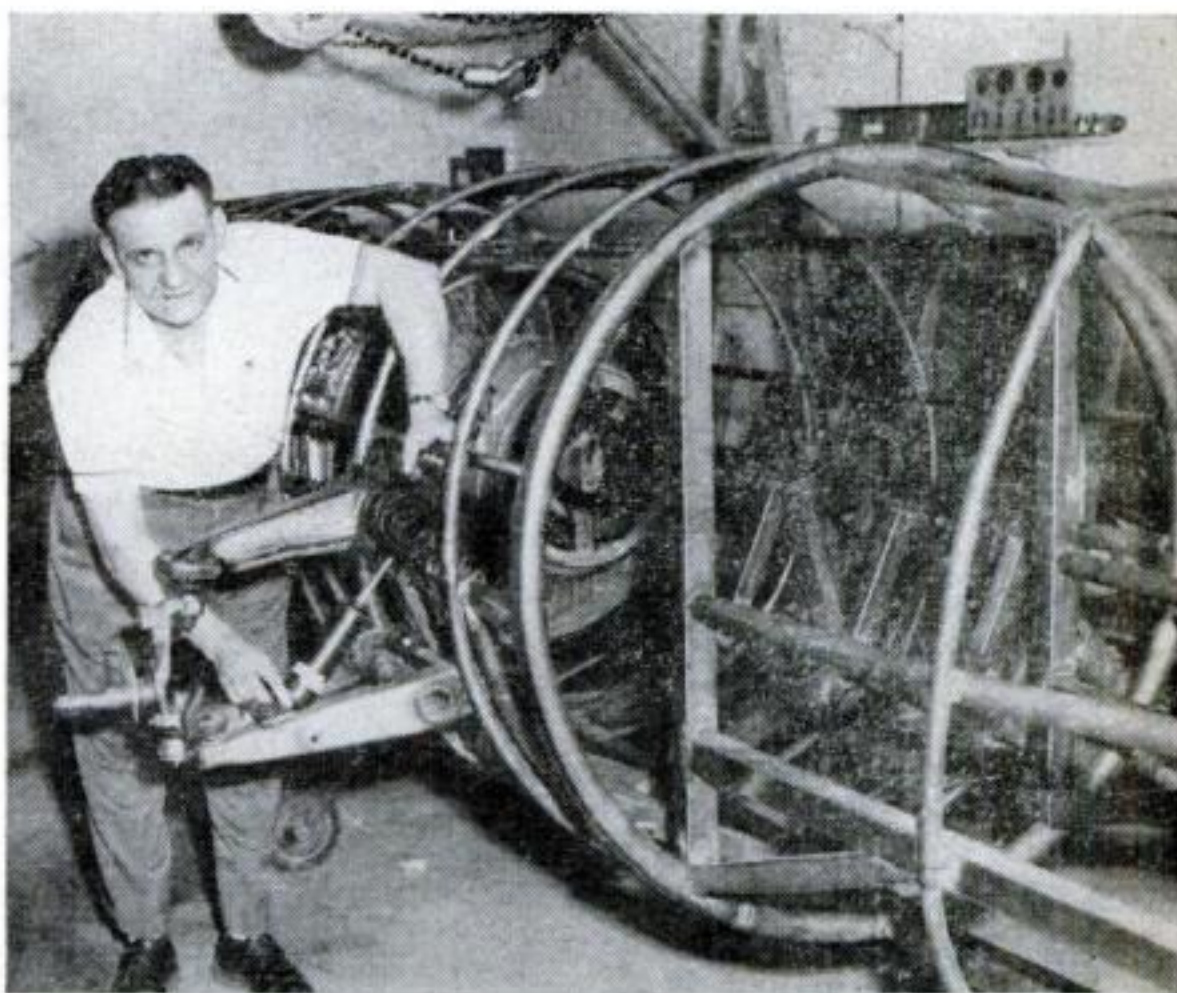
Two scale models of the car were built for wind-tunnel testing, which dictates design of the body so that the car will not take off into the air like an airplane.

Most cars of the past had stabilizers such as big tail fins, but tests proved a fin unnecessary for the Flying Caduceus.

The final model is simply a long, slim cylinder with a needle-pointed nose cone. The wheels are exposed, although most previous contenders faired their wheels into the body. Housing the wheels reduces wind resistance, but it also demands greater body width, increasing airplane-like lift. The vastly greater horsepower from the jet engine will overcome wind resistance.—*Robert M. Hyatt.*



**SAFE FOR 600 M.P.H.,** treadless nylon-cord tires, 48 inches in diameter, fit aluminum wheels.



**HUSKY SUSPENSION** hangs unstreamlined wheels outside body, which is just a tubing-reinforced can surrounding the big jet engine. Parachute will slow car before disk brakes are applied.





**These are typical "unmarks"**

**MAKE OR MODEL** can't tip off a police car in Delaware. Here Plymouth, Chevy, Ford, and Rambler American are among the ones off duty at a state-police barracks.

# Unmarked Police Cars: Good or Bad?

**By Edward D. Fales Jr.**

**Y**OU'LL be seeing lots of unmarked police cars on the road this summer. More accurately, if you're a fairly law-abiding driver, you'll *not* be seeing them.

More than 30 states are now using plain-clothes police cars. Two years ago, Wisconsin began with 10. It now has 25. Indiana has 60. Connecticut changed half its entire fleet to unmarks. And Delaware has stripped off all distinctive buggy-whip antennas, red beacons, and police insignia—and has gone 100 percent to unmarks.

"It's psychological warfare," says Delaware's state police superintendent, Col. John P. Ferguson.

"We want you to think," another officer told me, "that *any* car behind you may contain a policeman."

**Is this good?** Is it a real step forward in enforcement technique, or is it simple entrapment? Is it safe? How do patrolmen like it? What does a driver think when an unmark pulls him over?

To get some answers, we rode for three days and two nights with Delaware troopers. We hadn't been out two minutes before we had our first "case." We were riding in a blue-green Chevy Biscayne. It had no special tags, signs, or lights. Our aerial looked like anybody's, except that it didn't telescope. Our driver, in full uniform, was Trooper First Class Francis Melvin.

We headed south on U.S. 13, a divided highway. Suddenly a Pontiac in a hurry charged out of a driveway and cut in ahead. Melvin braked down hard.

"This never happens to us in a marked car," he said. "People are so polite then.

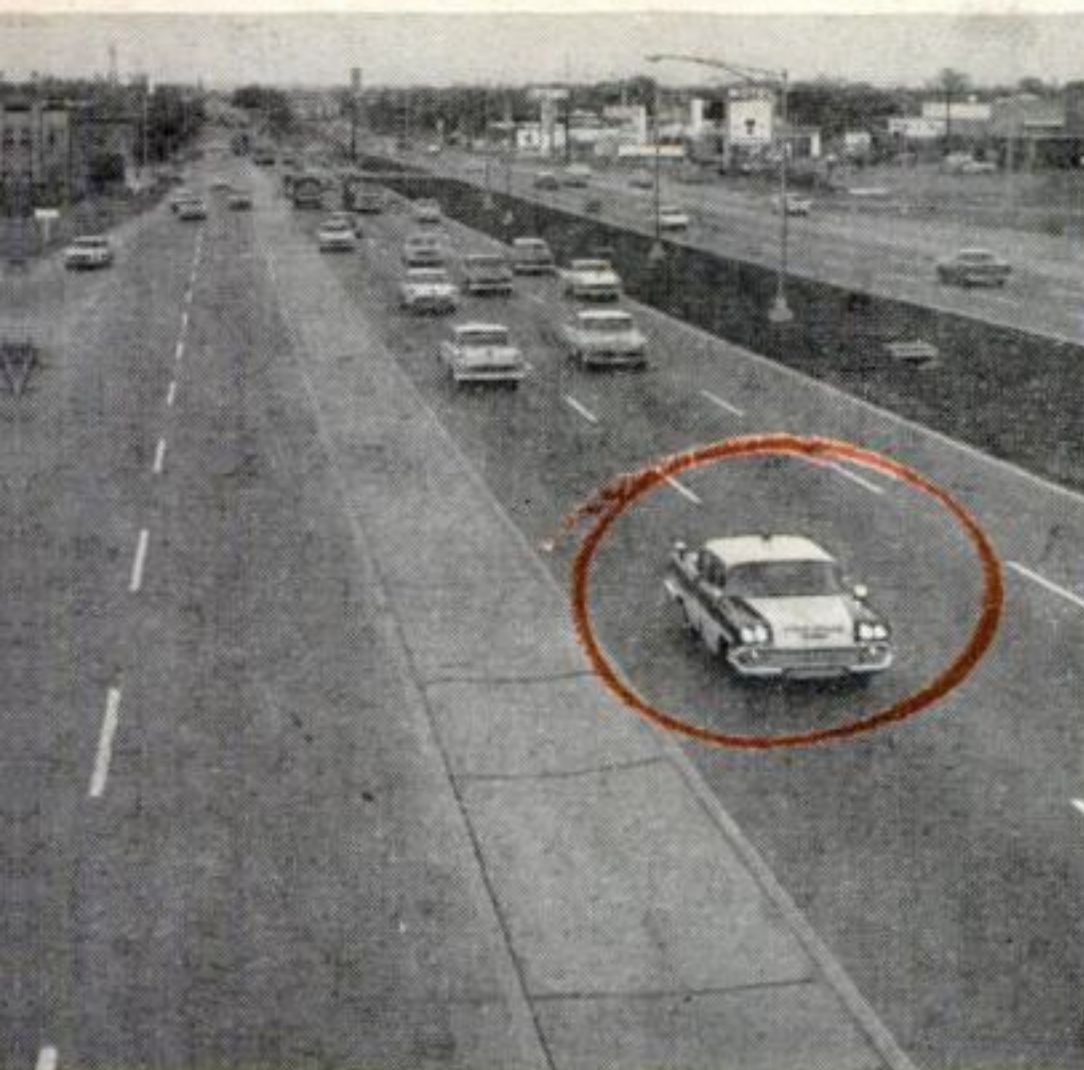
**Clocking a speeder is easy in a**



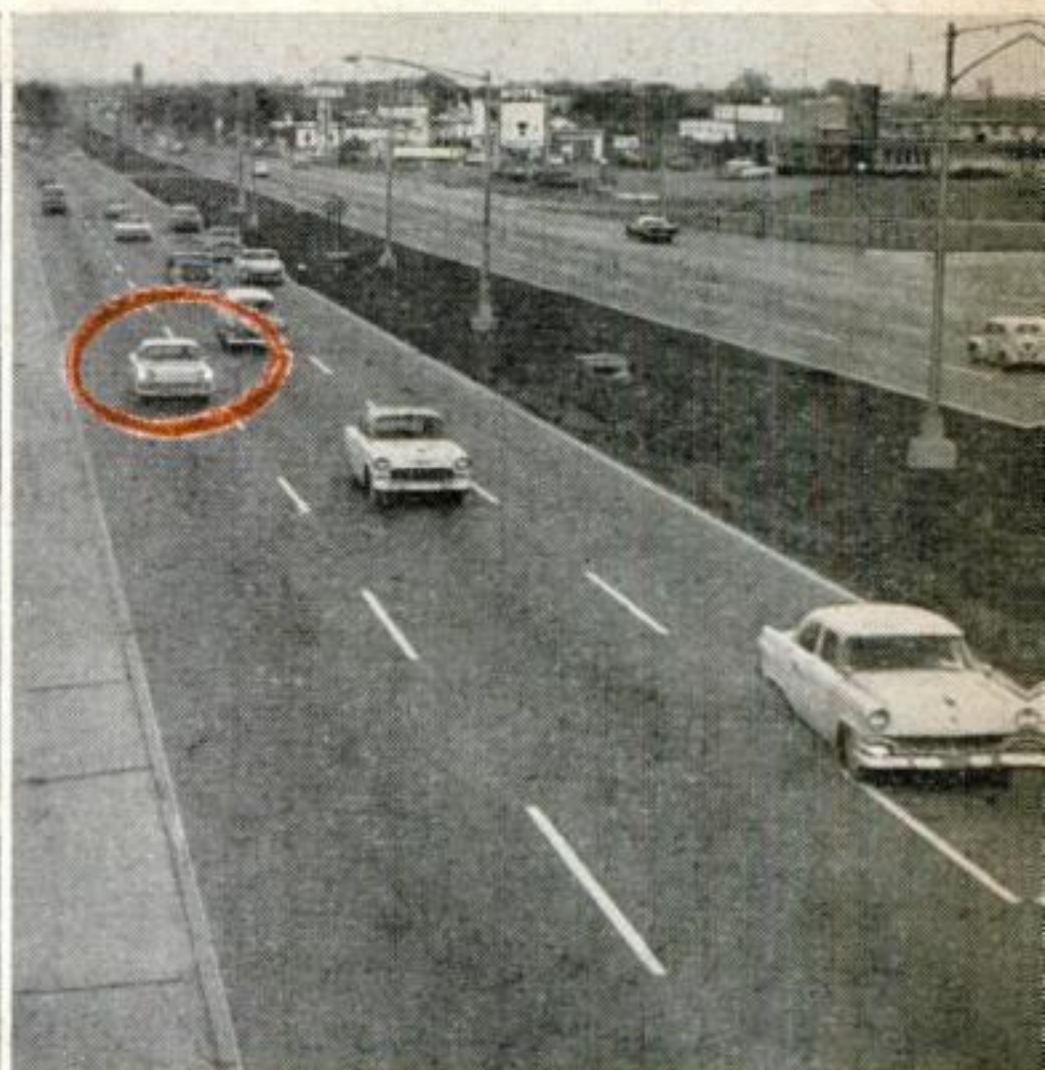
**TROOPER IN CHEVY** completes "clock" on man in Rambler (picture 1). In pictures 2 and 3 he overhauls speeder and, using siren, pulls him



**Here's one big difference between marked and unmarked cruisers**



**NOBODY PASSES** a plainly marked police car cruising within three or four m.p.h. of the speed limit. Instead, everybody stays demurely back.



**ALMOST EVERYONE** passes an unmarked car under the same circumstances. But alert drivers, noting the uniform, move on decorously.

**plain car, but stopping him may require a warble from the siren**



over. Pictures 1 through 5 were taken through windshield of a second plain car following the first. "Catching" is tricky from an unmark be-

cause it may startle a driver, or make nervous women suspect a stickup or pickup. Police make sure their uniforms are clearly visible.

CONTINUED



## Some drivers are serenely unaware as they sail by two troopers



**FOUR DRIVERS**, hitting it up a little above the legal limit, barge past uniformed troopers in

this sequence. Driver A is the only one alert enough to pull over to the right lane and ease

But in a plain car we get the works like anybody else."

He didn't stop the Pontiac—just eased ahead, letting the driver get a good look. The driver saw the uniform, gulped, and slowed down.

**Moment of meekness.** We stopped for a light, and a station wagon raced recklessly across U.S. 13. Then the driver spotted Melvin's uniform. The station wagon humped forward in sudden deceleration, and proceeded so meekly that we all laughed.

"He'd have spotted a marked car at once," Melvin observed. "But as soon as we were out of the way he would have been up to his old tricks.

"This is one strong point about a car like ours—it has what you might call a 'halo of influence' that reaches clear to the next state. Knowing that plain cars are around, that fellow won't rush any more lights in Delaware." We began to see the psychology: It was almost as if we had thrown a mental lasso around a reckless driver.

**Wising up a wise guy.** Later a pickup truck, trying to "push" us faster, blasted our mirror with his high beams

and stayed there. Then he swerved ahead, cut in front of us, and abruptly turned right into a driveway. His action said clearly: "I guess *that'll* show you!" He practically swallowed his gum when our Chevy stopped and a man in uniform strode up. Melvin wrote a warning.

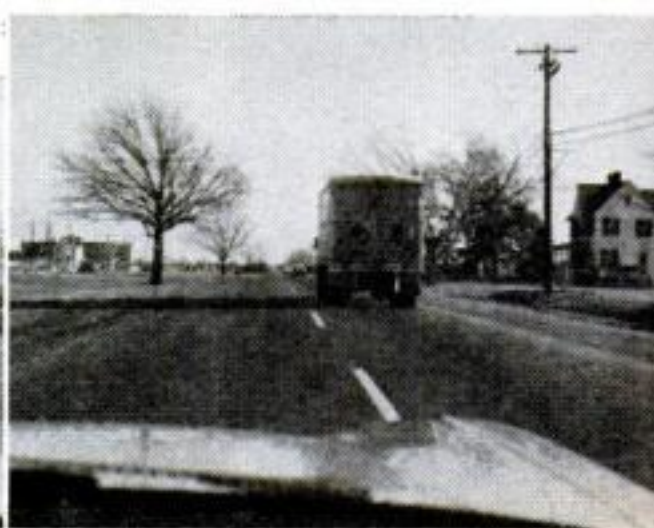
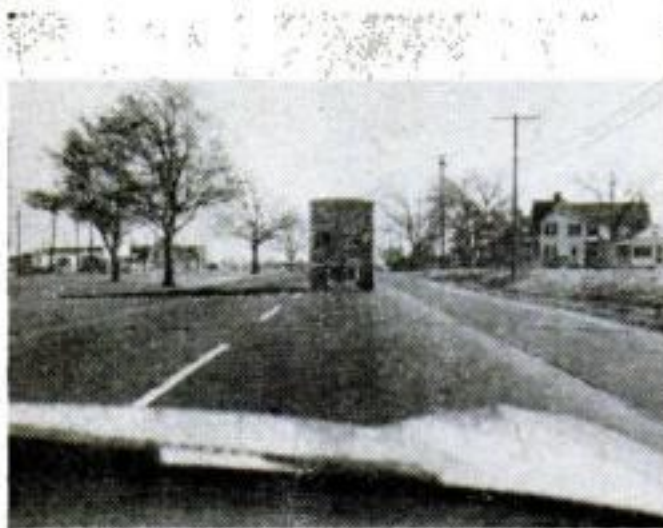
"He'll think twice before he annoys any motorists again," the trooper said as we drove off. For the guy in the pickup it was an upsetting experience. It would affect his future driving habits.

On later patrols, we saw many things police rarely see from marked cruisers: a woman with a carload of kids sneaking through a stop sign; two cars running a red light; a speeding driver who slowed down when he spotted radar—and then speeded up when he thought he was unobserved.

Some motorists, we'd heard, complained that unmarked cars were "sneaky." In fairness we must say that we saw no sneaky activities by any of these Delaware troopers. The only sneaky things we saw were being done by ordinary motorists. Nor did these well-trained young officers seem to feel they had a grievance. At no time did we

## Even the "old foxes" can be caught this way

**WISE IN THE WAYS OF COPS**, interstate truck drivers are tough to clock from a marked police car. But the driver of this semi, tooling along way above the limit, ignored the seemingly harmless sedan that dogged him. When sirened over to the shoulder, he explained imaginatively: "There must have been more tail wind than I thought."







off. But B, C, and D keep going briskly, not quite fast enough to warrant being stopped.

Troopers watch out for recklessness or incompetence quite as much as for speeding.

tail anyone just waiting for him to do something wrong.

One night a car whirled out of a street ahead, backfired, and dug out fast. Noisy mufflers have become a plague in Delaware, so Trooper Melvin spun around in pursuit. Our siren growled. Melvin switched on our inner light—so his uniform would be seen. The car stopped.

Melvin read the lad's license. "Now, George," he said, "push your brake while I check your lights." Stop lights not working. Melvin noted a jagged window pane—deadly and illegal. "Now pull your hand brake," he said. Incredibly, it came right out in the driver's hand.

"Now," said Melvin, "let's hear your muffler."

George gunned his motor tactfully. The exhaust burbled. "Now I'll try it," Melvin said. He floored the gas, then let go: "*Blaa-a-pop-BANG!*"

Melvin might have thrown the book at this lad. Instead, he wrote a warning. "George, I'll give you five days to fix things and get a real muffler. And I don't mean steel wool stuffed up this one."

Drivers often got warnings instead of tickets. This wasn't all charity. "We'd

be in court all day long," a trooper noted, "if we arrested drivers for all the things you see from these cars."

*The driver's angle.* To see how the public felt about unmarked cars, we began interviewing drivers who were stopped. One in five objected. A truck driver said, "Unfair." A garageman said, "For me, I don't like them. For the other guy, it's all right." A Maryland salesman said, "If I need a cop how do I know when I've found one?" (It seemed a good question.) A Pennsylvania city official, caught speeding, said: "Honestly, I think it's a good idea. I'm going to put this in effect back home."

Surprisingly, not one Delaware driver objected. One Massachusetts man in a Cadillac did—but he is one fellow we did not talk to. He spotted us, got behind us, and kept flashing his headlights to warn other cars. That's what he thinks of unmarks.

He was taking a chance. Any trooper knows that if you want to arrest a driver for something, just follow him long enough and he'll make a mistake. Our trooper could have caught this amateur Paul Revere for something. Instead, he





## Crosley That Caught the Caddy



In Delaware last spring, a Cadillac traveling at high speed carelessly crowded a tiny Crosley station wagon toward the ditch. When the Cadillac driver noticed the little car coming in pursuit, he pulled away at 90 m.p.h.

At a traffic light down the highway, where the Cadillac was temporarily halted, bystanders were amused when the little station wagon puffed up. It disgorged a trooper in uniform who promptly arrested the speeder.

"His mouth fell open so wide you could have stuffed a watermelon in it," says Trooper Walt Saxton. "It's my own Crosley—not a regular unmark. I was on my way to work. I floored her and got her up to 70. But the crankshaft fell apart a few days later."

laughed, turned around, and cruised the other way.

Delaware, we found, uses her unmarked cars for patrol work of any sort. Some states use unmarks only against "hazardous violations"—drinking while driving, running red lights, racing, speeding, and trucks tailgating each other. We were to see how useful plain cars are against speeders.

**Stopping the wily ones.** "It is almost impossible to catch speeding trucks with marked cars," a trooper told us. "Those

old pros can smell a police car a mile away."

We were waiting in two plain blue cars when a big Florida truck went by. This bird was hitting above 60, weaving through traffic. He saw us clearly.

"If we had whip aerials," one trooper remarked, "he'd be down to 45 already."

Out we went. We know he saw us coming up fast—because he said so later. "But I didn't guess you were the cops," he said. "It's getting so you can't spot a police car any more. Do you think it's fair?"

We couldn't answer, because we were beginning to realize that it is a double-barreled question. The other half of it is: "fair to whom?"

**"Wrong-siders."** Late one night we heard an urgent message on the radio: "Stop car driving south at high speed in northbound lane." Some drunk had gotten on the wrong side of the divided highway. The scene was 60 miles away, and we waited helplessly for reports of the head-on crash, perhaps with some unsuspecting, law-abiding family. Would it be unfair to that drunk to have stopped him with an unmarked car? What about fairness to the family?

This crash never came off; they caught him first. But night after night those "wrong-side" drivers charge down many U. S. roads. We saw one miserable pile of junk—all that remained of a recent "head-on."

"Against guys like that we need every weapon we can get," a trooper told me. "This is no game of tennis. Besides, if they see us coming in a marked car, the chase gets faster and lasts longer."

We were southbound on U. S. 13 when Melvin said quietly:

"Speeder coming north."

It was a drizzly evening, near supper-

[Continued on page 195]

## Officials Differ on Unmarked Cars

Police departments, state officials, and automobile associations have mixed feelings about the wisdom of plain cars:

1. The more than 30 states now using them naturally approve in greater or less degree. Argues one state-police official: "Unmarks are essential for good enforcement, because they are the only way that some offenders can be caught."

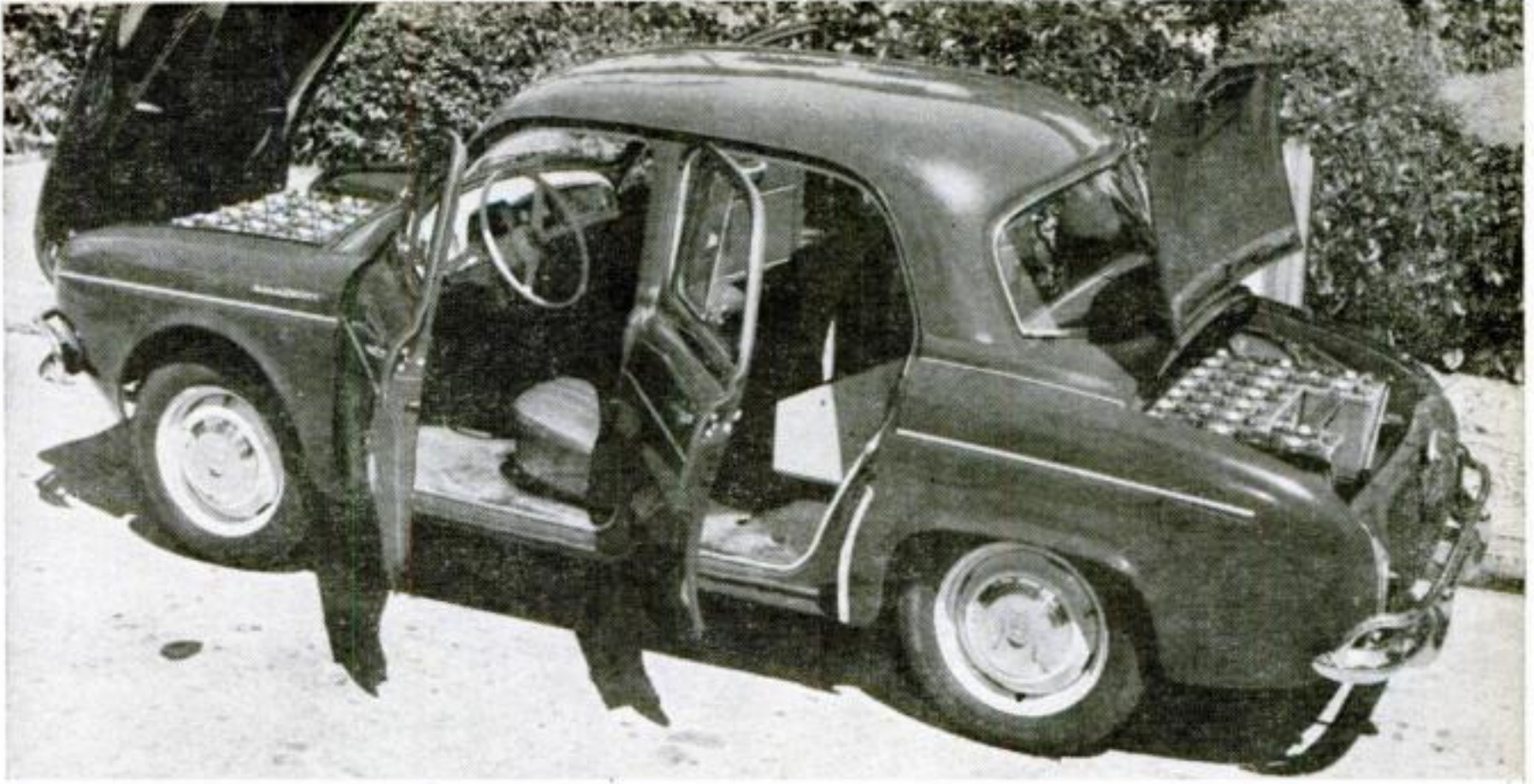
2. The American Automobile Association

opposes the use of more than a few unmarks for special investigations. It believes that marked cars do more to discourage violations because of their ready visibility.

3. The National Safety Council and the International Association of Chiefs of Police favor unmarks "when the job can't be done by marked cars."

4. Legislatures in Georgia and North Carolina recently voted a ban on unmarks. Minnesota forbade the purchase of additional ones. Wisconsin recently said "yes."





### Car charges front and rear

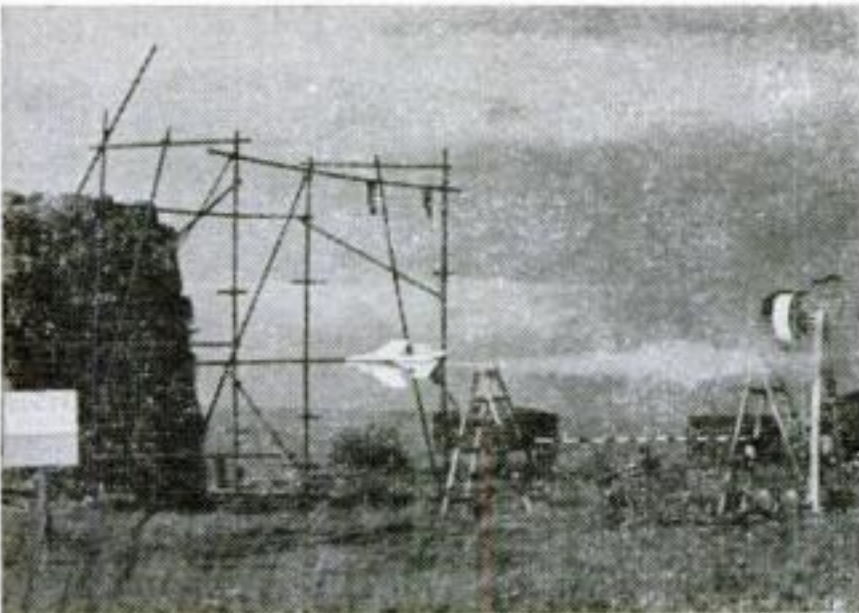
Power from 18 two-volt batteries under the hood and 18 more under the rear deck operate this electric car. It has a top speed of 35 m.p.h. Its range is 40 miles if run constantly or 50 to 60 miles with frequent stops. It can be recharged overnight from a 110- or 220-volt outlet.

The Henney Kilowatt is built into a Renault Dauphine body with the rear seat removed to make room for a controller, which is regulated by a foot accelerator. This varies voltage going to a traction motor connected to reduction gears and rear axle. A switch on the dash puts it in forward or reverse.

The car won't be sold to the public. It's designed for short-haul utility maintenance and meter-reading use. The maker is Henney Motor Co. of Canastota, N.Y.

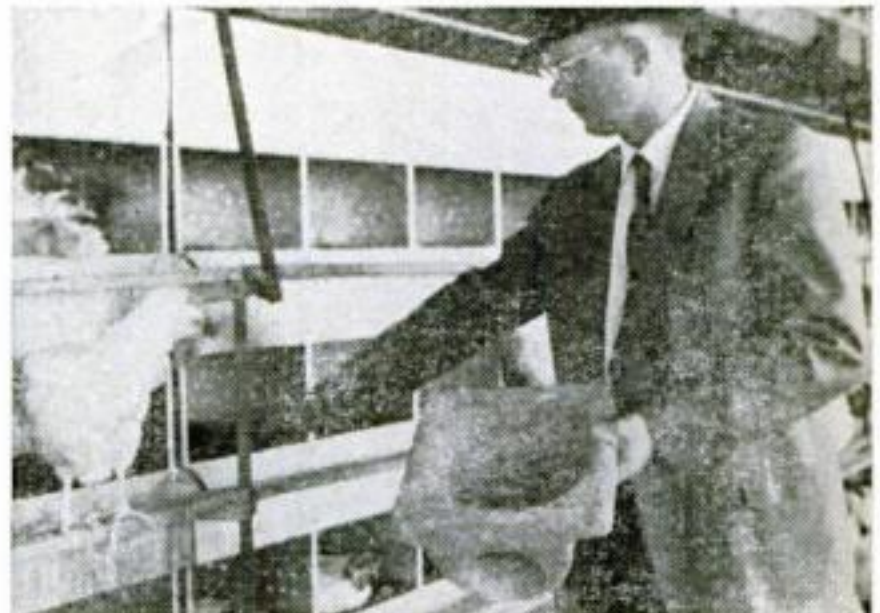


Recharging on house current.



### For rocket archery

The bales of straw at left above take the impact of a test-fired British Seacat missile. The archery-target technique, developed by Short and Harland, Belfast, Ireland, eliminates need for an extensive firing range. The angle-iron frame at right serves in place of a naval vessel's more elaborate launcher.



### Fiber nest for laying hens

A fiber cushion instead of litter is being used in hen houses at Pennsylvania State University's agricultural experiment station. New-laid eggs roll out of a hole in the back into a mechanical collecting tray before they can be soiled. The cushions are brushed clean periodically or washed by a hose and water.



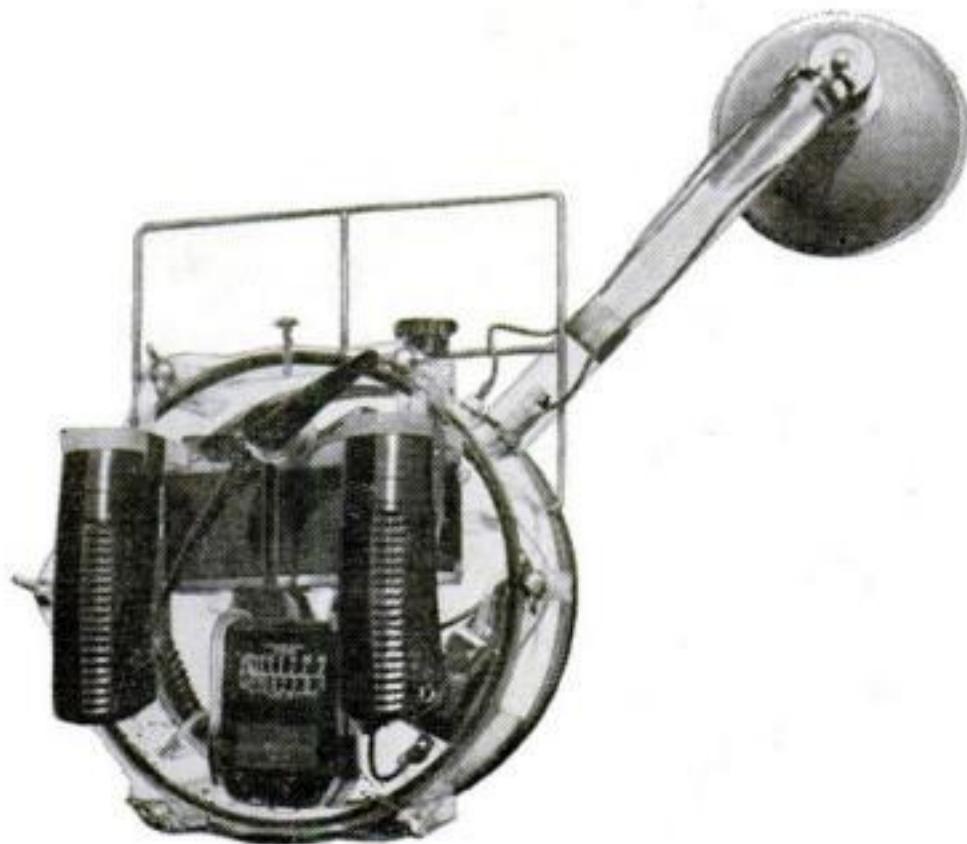
# What's New for Skin Diving



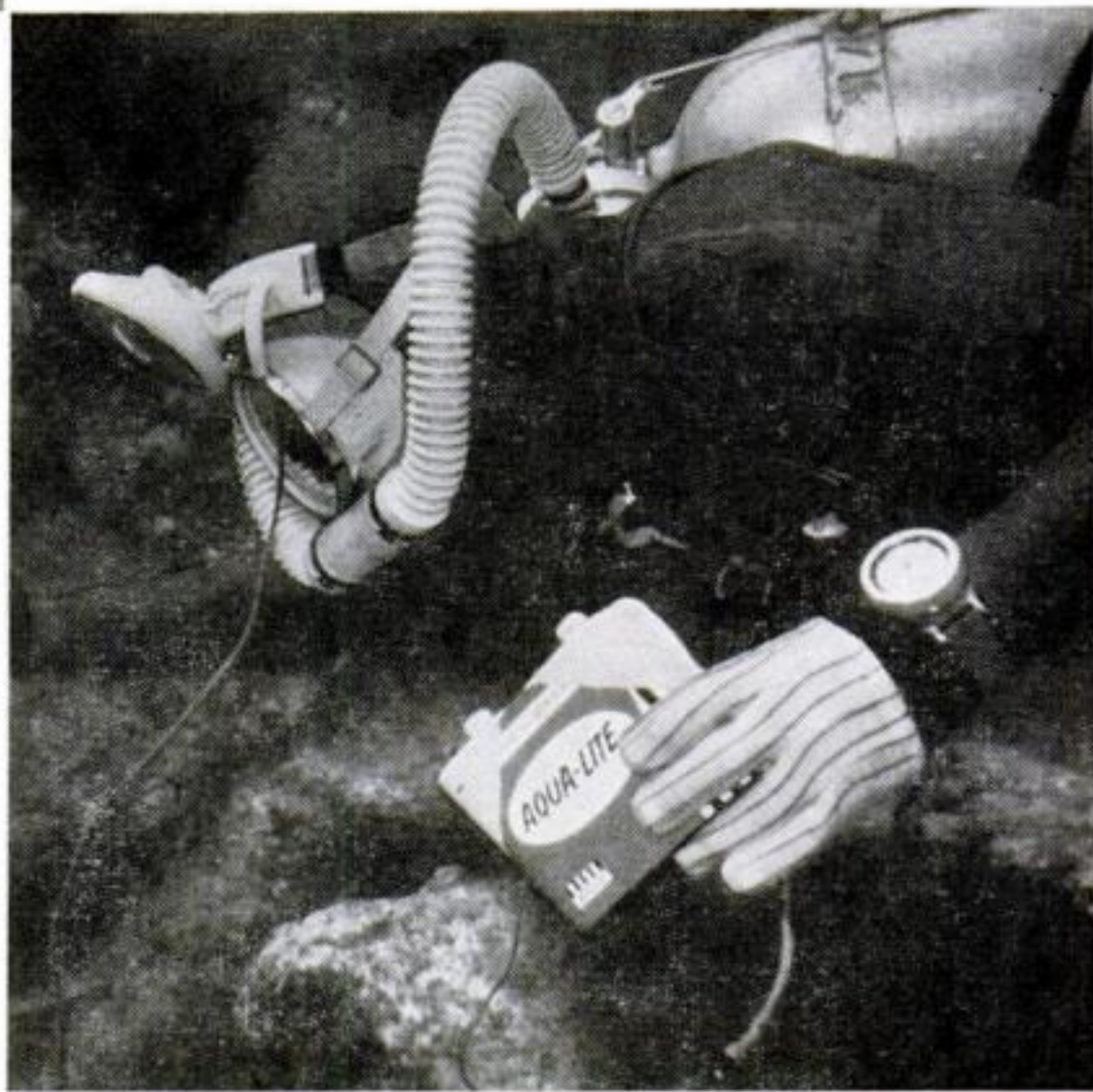
**Diving mask** for deep-water and lung divers has two metal prongs protruding from the front. When squeezed together they pinch the nose inside the mask and relieve pressure on the ears. It's said to speed up descents. \$6.95. W. J. Voit Rubber, 45 W. 18 St., NYC.



**Free skin-diving lessons** come with the purchase of equipment at the Blue Fin Aqua Shop in Inglewood, Calif. The indoor pool is part of the store. It's a trend developing among West Coast shops that specialize in diving.



**Light meter and camera** are sealed inside this plastic housing. The BC flashgun is mounted outside for better lighting angle. Custom built for Leica. \$150. Dive-Rite, Box 3445, Long Beach, Calif.



**Night-diving lamp**, strapped to the head, has a sealed-beam bulb and a dry-cell battery that clips on the belt. Exposed parts are dipped in plastic. On diver's wrist is an Admiral compass-depth gauge. Lamp, \$9.95; gauge, \$15.95. Ski N'Dive, Bellflower, Calif.

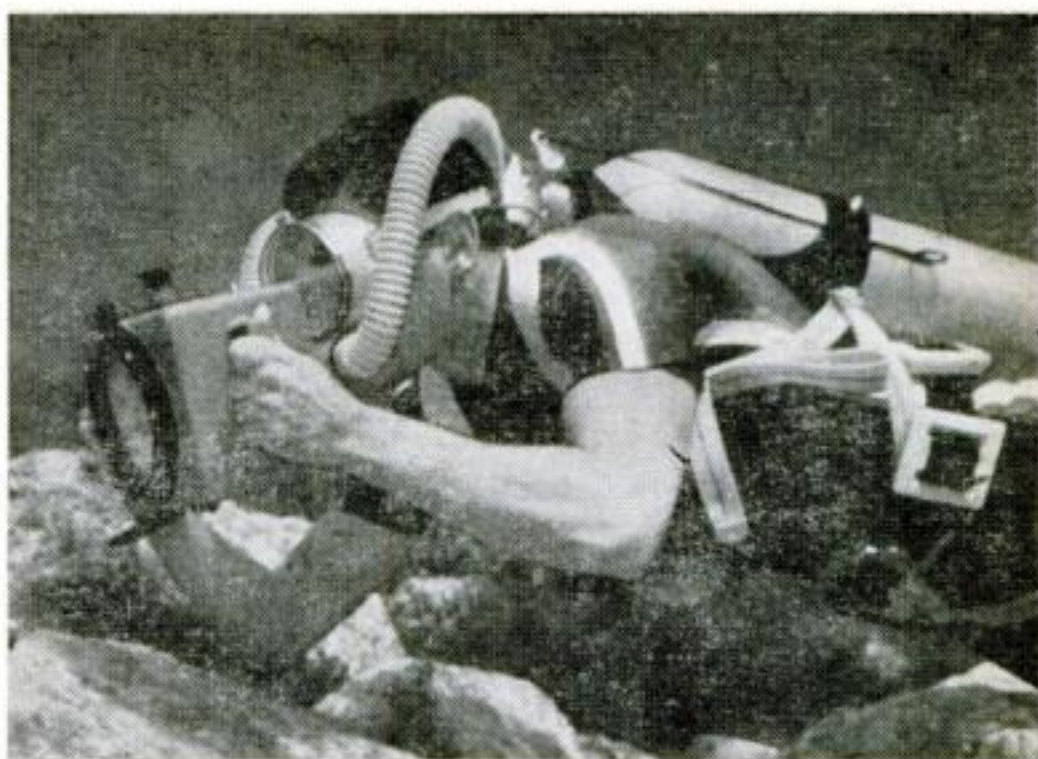




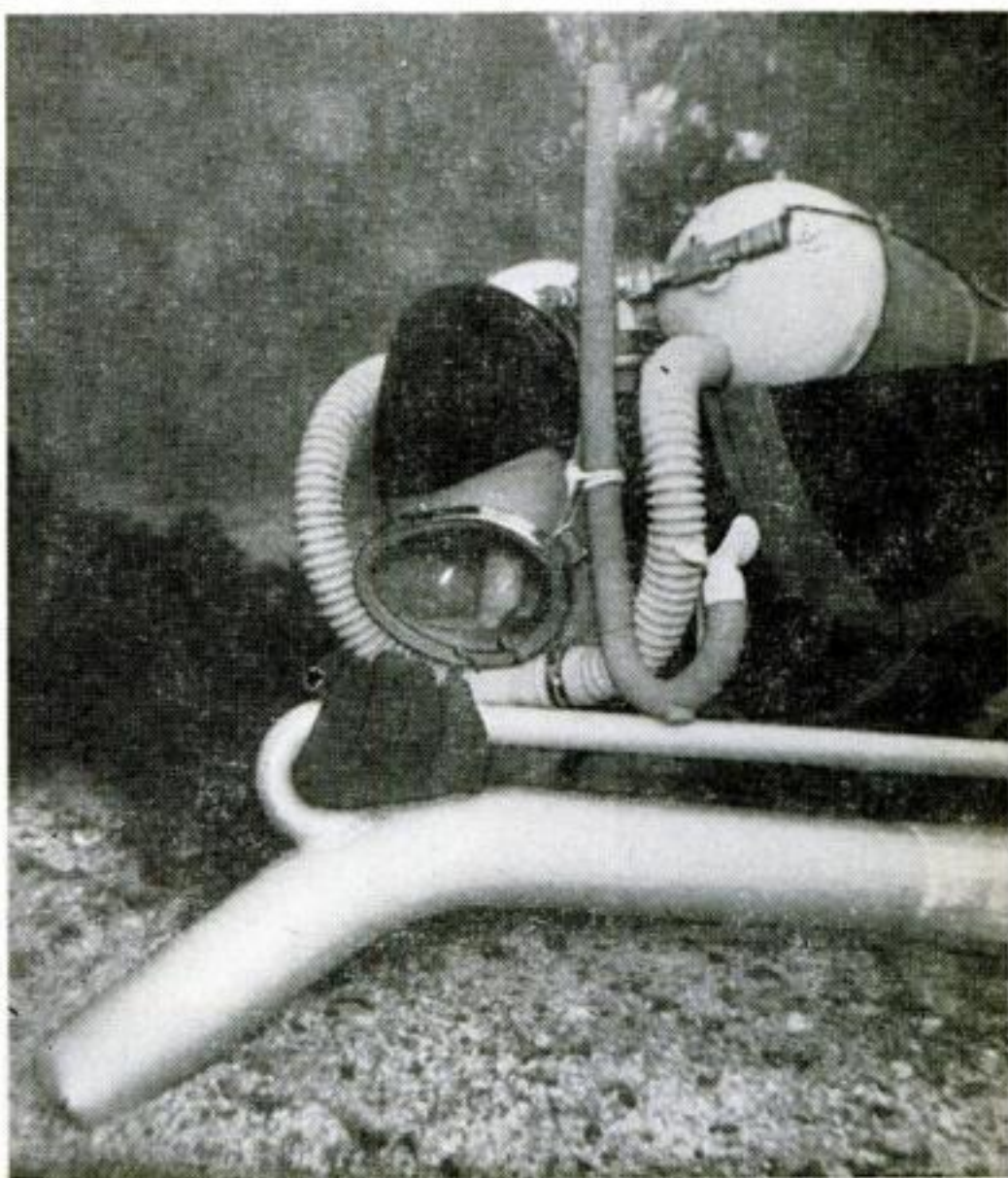
**Caution—diver below.** Diver's flag, with a diagonal white stripe on orange-red background, has a plastic batten in the top edge to keep it flying. Staff is hollow plastic, weighted at the bottom. \$8.95. U. S. Divers Co., 3323 West Delhi Rd., Santa Ana, Calif.

**Diving for gold,** a new West Coast hobby, is done with a portable venturi-type dredge. It sucks up sediment, traps any gold dust or nuggets, and spews everything else out the other end. Prices start at \$215. Portable Drill & Dredge Co., Pomona, Calif.

**Two-man Italian sub** has 18-foot fiber-glass body weighing 500 pounds. It runs four hours on batteries, does four m.p.h. submerged, six m.p.h. on surface. Breathing equipment is built in. Deluxe version, \$2,500. Healthways, 3669 7th Ave., Los Angeles.

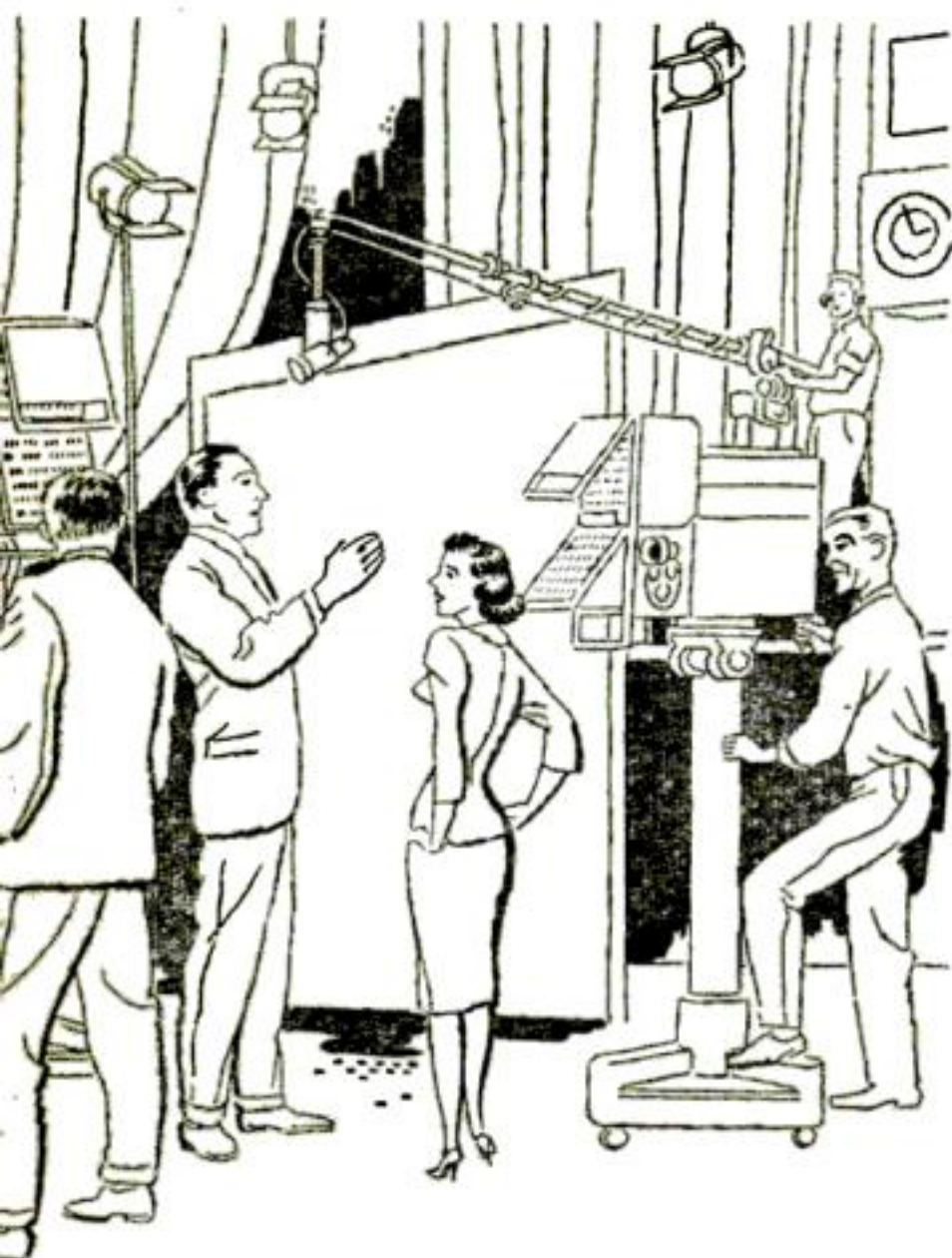


**Underwater housing** of aluminum has ingenious adjustable controls that can be connected to over 80 percent of the 35-mm. cameras now on the market, its makers say. The Mar-Vel sells for \$95.00. M & E Marine Supply, Camden, N. J.





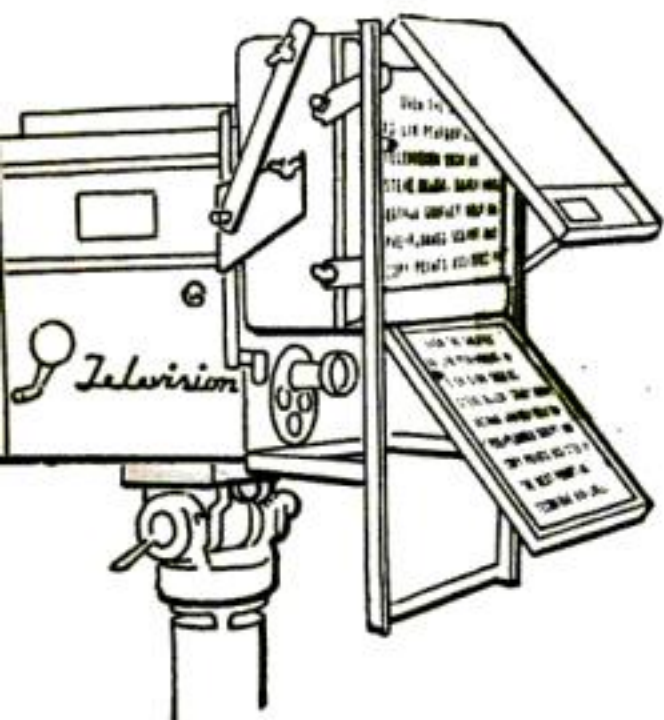
# How a Teleprompter Works



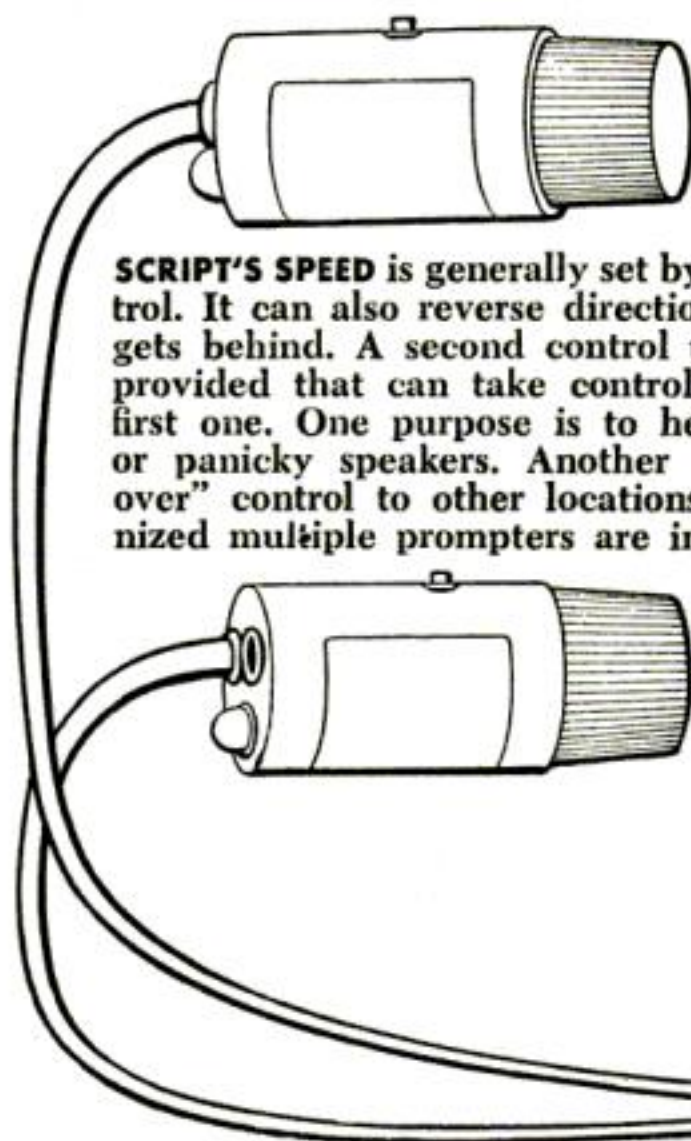
**W**ATCHING a famous actress fumble her lines gave Fred Barton the idea for the teleprompter. His original device, built in 1950 while he was a member of the "Mr. Roberts" cast, was a roll of waxed butcher's paper mounted in a box and cranked by hand.

Today the TelePrompter Corp. rents an electronic version to TV stations, film studios, and business and political organizations. The company's big break came in 1952, when former President Herbert Hoover used a teleprompter to deliver his speech to the Republican National Convention. Both parties have relied on them heavily at every convention since.

The teleprompter's heart is a pair of motor-driven drums, one above the other, that wind a roll of printed paper across a viewing area. By remote control the drive motor can be speeded up, slowed down, stopped, or reversed. Accessories adapt the unit to a TV camera, floor stand, or lectern.—*Erik H. Arctander.*

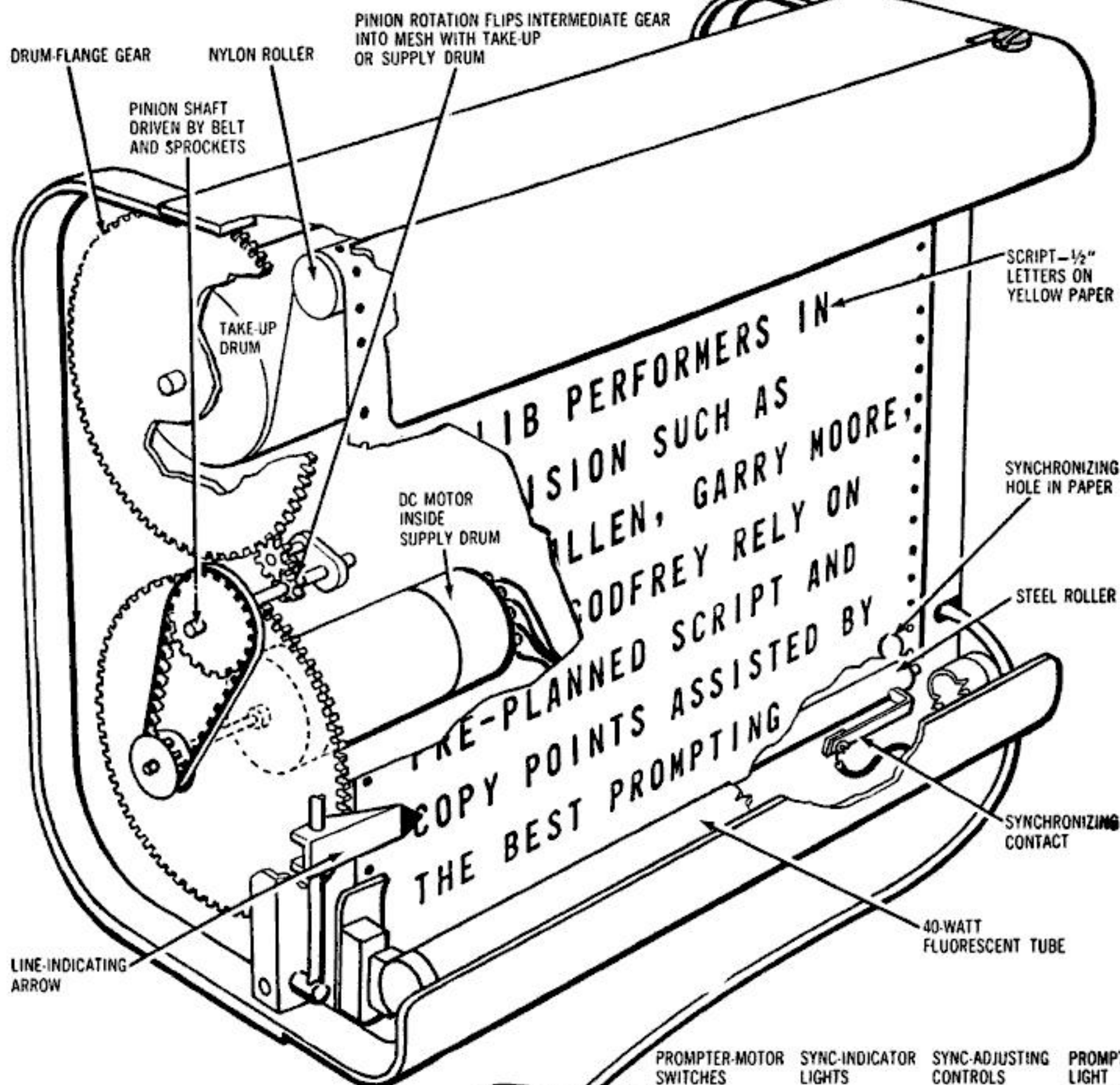


**TO AVOID A SHIFTY-EYED LOOK**, where a performer is supposed to be looking straight at audience, a rig like this may be used. Upper sheet of glass is a mirror, and lower sheet is one-way glass through which camera can shoot.



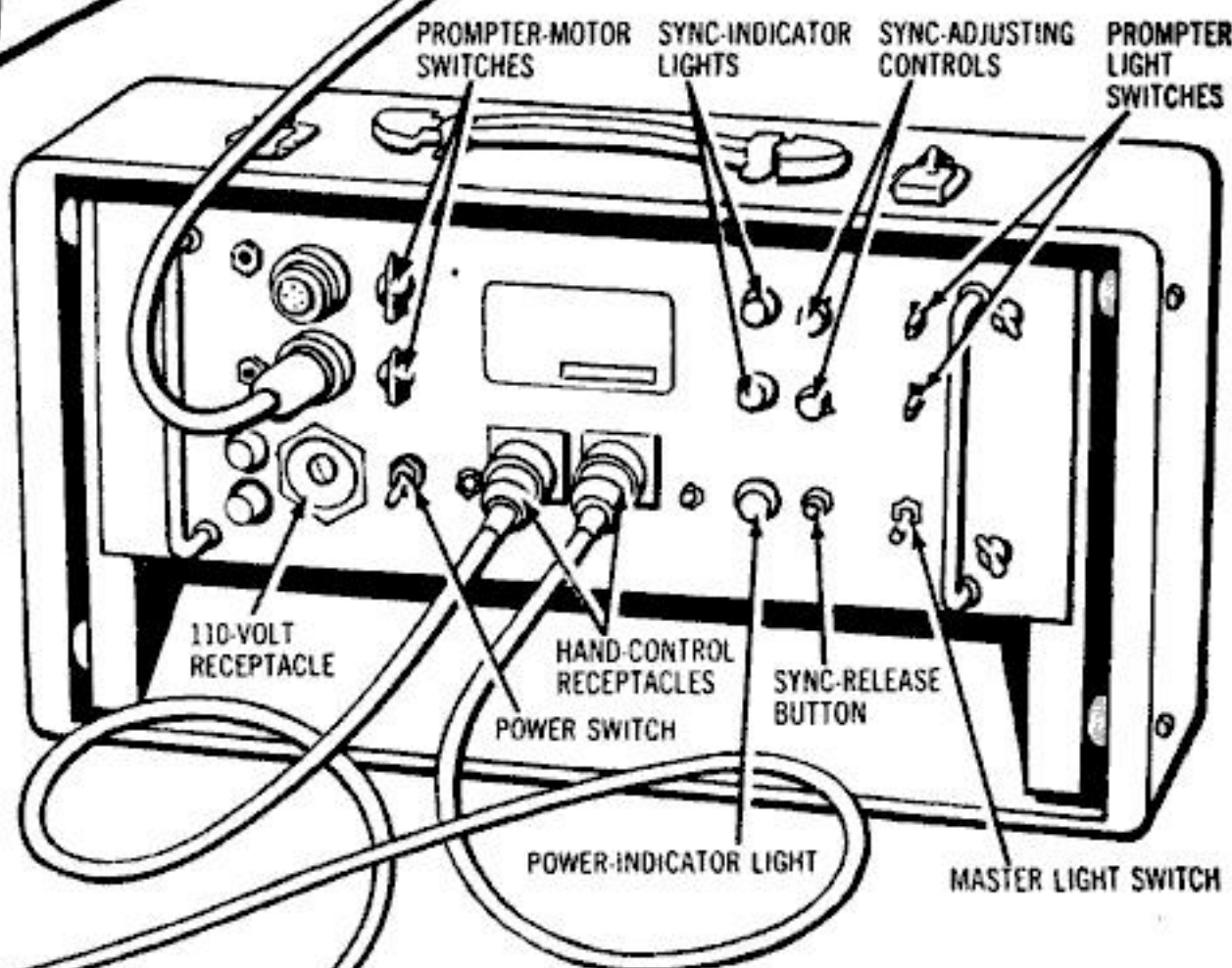
**SCRIPT'S SPEED** is generally set by a hand control. It can also reverse direction if speaker gets behind. A second control unit is often provided that can take control away from first one. One purpose is to help confused or panicky speakers. Another is to "hand over" control to other locations if synchronized multiple prompters are in use.





**PERFORMER** or an operator works hand control, speeding up or slowing down the motor that drives take-up drum. To rewind the roll he reverses the motor. This rotates the pinion shaft in the opposite direction, flipping the intermediate gear on its movable shaft to the supply drum.

A group of prompters is kept in synchronism electronically. At the lower right corner of the viewing area a contact rides on the paper as the paper runs over the steel roller. When holes, punched eight inches apart along the paper's right-hand edge, move under the contact, a circuit is completed with the steel roller. The master unit then stops fast prompters briefly until slow ones catch up.





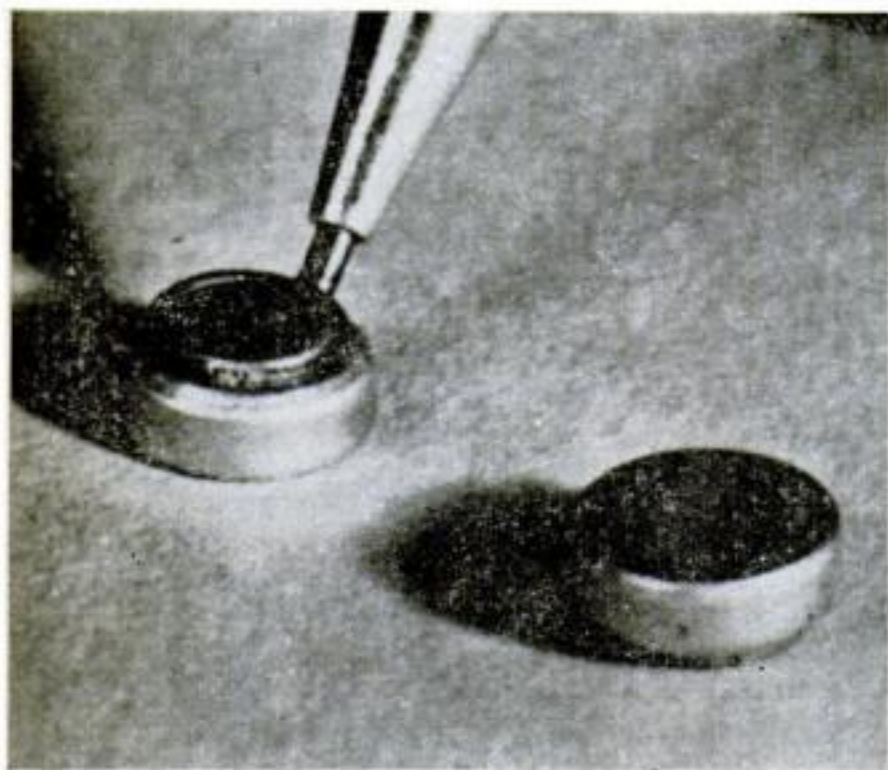
## Helicopter rescues helicopter

When a Navy HSS-1 developed engine trouble on sonar patrol off the coast of Florida, the pilot managed to land it on isolated Sand Key. A big 12-ton Army H-37 then went to the rescue.

Fuel was drained from the grounded craft. Electronic and sonar equipment and both rotors were removed to lighten the load, and it was then airlifted five miles to Key West. Photos show how.

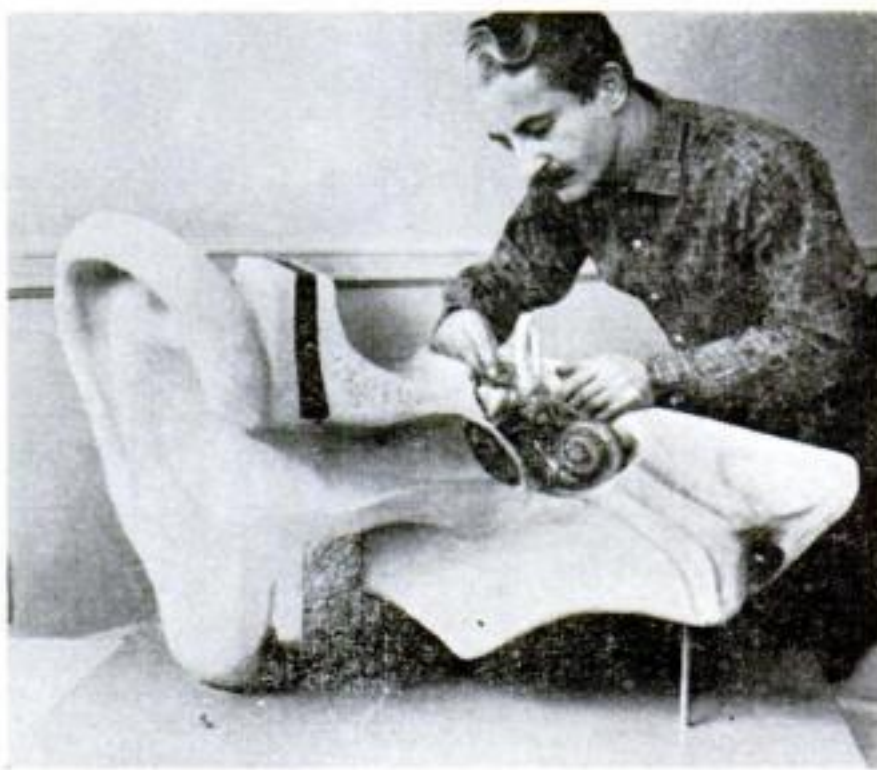


Cargo sling is attached to de-rotored grounded craft . . .



### World's smallest battery

These tiny mercury batteries (enlarged three times in the photo above) are only .3 inch in diameter and .125 inch high—about the size of aspirin tablets. They were developed for use in in-the-ear hearing aids, pocket radios, tape recorders, and space-satellite communication instruments. They won a national miniaturization award for the makers, Mallory Battery Co. of Cleveland and Ruben Laboratories of New Rochelle, N. Y.



### Oversize ear that works

Simulated sound waves strike a rubber eardrum in this sculptured ear to set in motion its hearing machinery. This consists of plastic bones and clear fluid in a transparent, snail-shaped chamber where fluorescent fabric membranes resonate with the sound. Convert these movements into electrical energy, and the ear could hear. The model was built by Paul Newman, New York medical sculptor, as a teaching aid for medical schools.





... rescuer takes off with rescued ...



... lands it safely at naval station.



### Triple-decked fireboat

The odd-looking craft above was built for an oil-tanker firm to combat ship fires in Swansea Harbor, Wales. It is equipped with nine hoses at the corners of the two upper decks and on the pilot cabin. They deliver 3,700 gallons of water or 15,000 gallons of foam a minute. Seven of them can be aimed in the same direction. The 60-foot float is powered by two diesels and has tired wheels fore and aft to move it alongside a ship.



### Space-radiation counter

This rocket-borne missile capsule will measure radiation for NASA from 1,800 to 10,000 miles in space. Counts will be taken by radiation-sensitive strips of nuclear emulsion in its nose disk. The recovery system of the GE-built vehicle, consisting of parachute, radar, flashing light, and dye marker, has already been tested successfully in a 35,000-foot drop off the California coast from an Air Force F-104 Starfighter.



## SAC's New Weapon:

# TREETOP

*Skimming a heartbeat above ground, daring B-52*

**By Frank Harvey**

**W**E WERE buried in the pine forest off the end of the runway at Westover Air Force Base, Mass. We were there to witness a demonstration of a daring new Strategic Air Command technique—a tree-level bomb run by a Boeing B-52.

It was 10 in the morning of an overcast day—and I was cheating. I was peeking through the pines straight down the 11,600-foot runway, which converged in the distance like a Dali painting. At its end, the four-story tail of a B-52, looking like a drunken witch's hat, turned into takeoff position. The eight jet engines of the massive bomber made a hot and evil roar. As the plane finally lined up facing me, it looked like a real bird of doom—skeleton-white wings drooping and seeming almost to touch the earth, a big white beak. When the pilot moved

to takeoff power, a storm of brown smoke boiled up around the tiny distant bird-shape.

"Here she comes!" I yelled to POPULAR SCIENCE photographer Bill Morris, farther back among the pines. "Get set to shoot!"

I did not hear Bill's reply. The oncoming bomber was now filling the sky with its demon bellow. It was rushing directly at me on the ground, and showing no signs at all of getting into the air. I cocked my Nikon and took aim. About a minute passed. The plane had to get up now or run over us, and of course she lifted—just enough for the pilot to suck in his gear—then dropped a foot or two. I started shooting, working the camera lever like the bolt action on a rifle. I got off two shots when the monster suddenly filled the whole sky, whipping the 20-foot pines like buggy whips. The hot blast of the jets washed over me and





# BOMBING

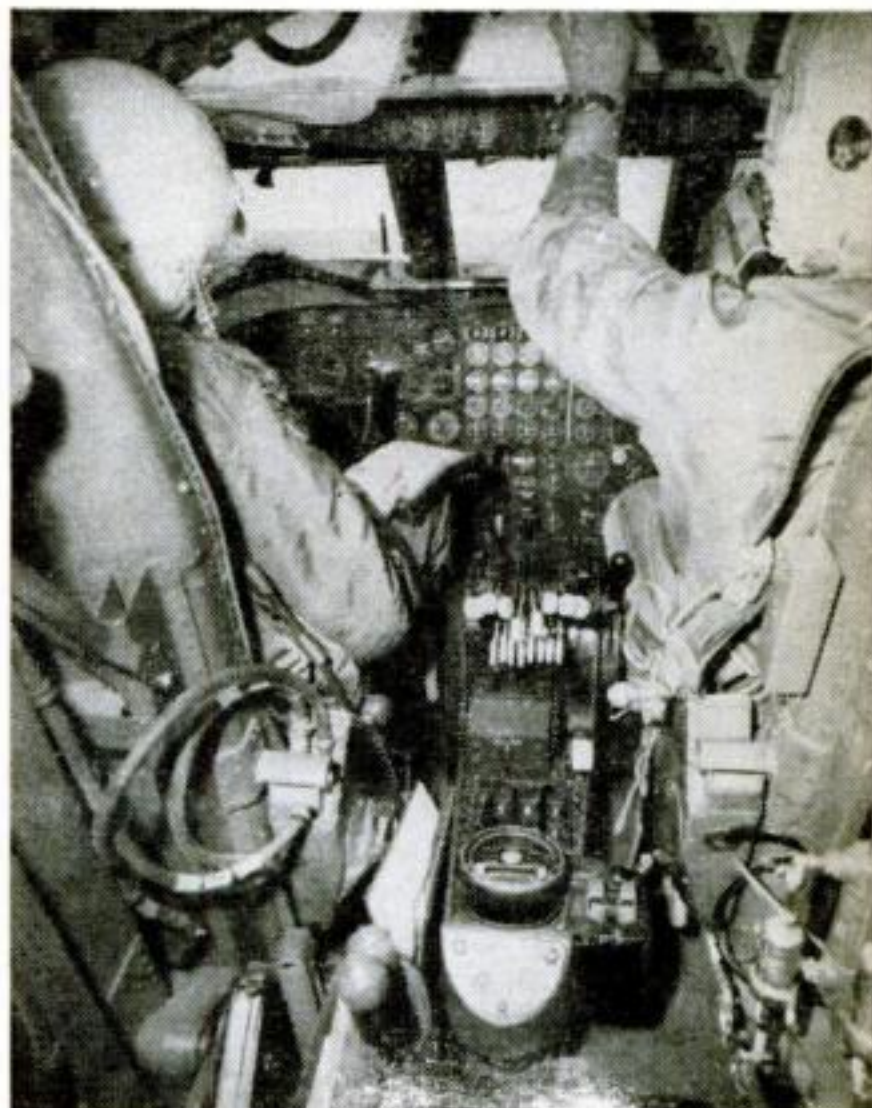
*men can sneak under enemy radar to their target*

PS PHOTOS BY W. W. MORRIS

drove me to my knees. I lurched around and shot the departing bomber through its own brown smoke and the flailing brambles. Then it was gone—a diminishing roar behind the trees.

Now then—why this seemingly mad-cap prank? Were we risking a \$6,000,000 plane and the lives of six SAC men just for an exciting picture? Not a bit of it. That B-52 was one of hundreds that practice low-level penetrations, day and night, rain or shine, on seven separate low-level ranges in various parts of the United States. The reason: No subsonic bombers (which our B-52s and B-47s definitely are) can hope to penetrate deeply into enemy territory at 40,000 feet without meeting a withering attack from supersonic fighters and missiles. To

**IN FRONT OFFICE OF B-52**, pilot and co-pilot make final checks for low-level bombing mission while waiting control-tower takeoff clearance.



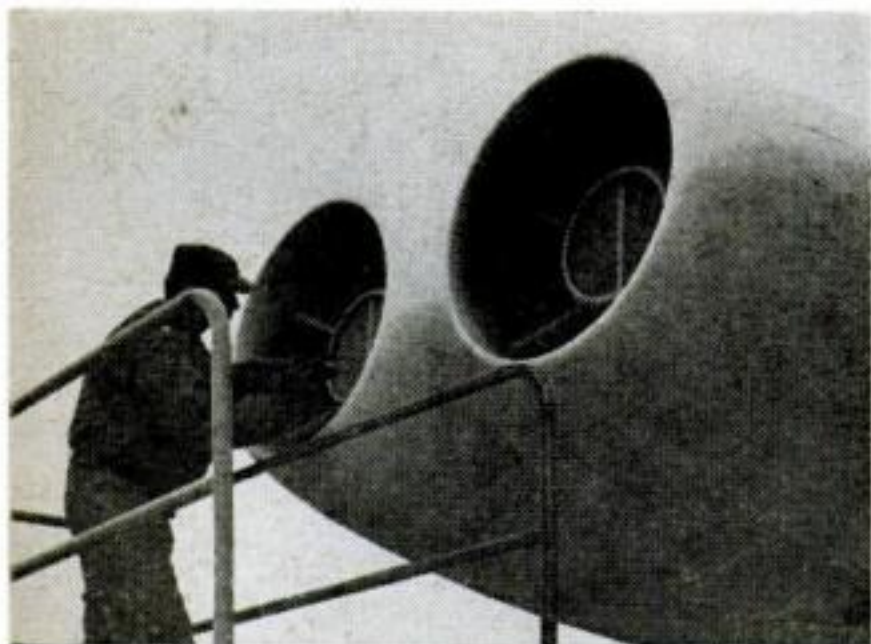
CONTINUED



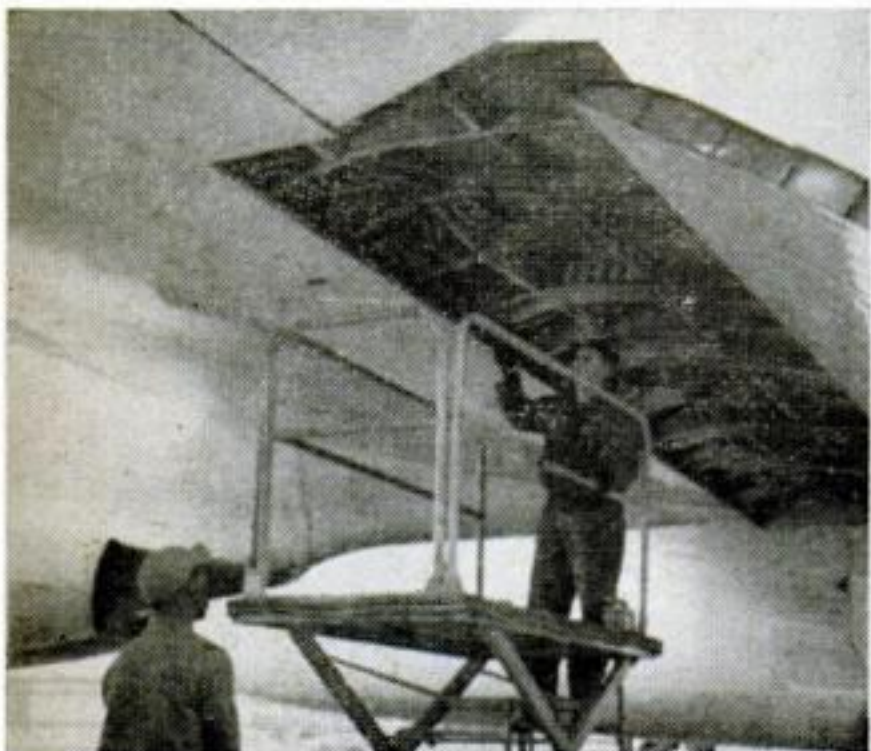
## Superfortress gets preflight inspection before each mission



**LANDING GEAR IS CHECKED** by aircraft commander. It will carry 350,000-lb. takeoff weight.



**INTAKES** of eight jet engines are carefully scrutinized with the aid of a flashlight.



**MOVEMENT OF FLAPS** is tested in walk-around checkup that leaves nothing to chance.

avoid this deadly exposure, some of our big SAC planes are training to go in on the deck where they can zip in under the radar screens, pop up just before reaching the target, drop their hideous hydrogen eggs, and run for home.

**Delivering a "thermonuke."** The Air Force is not saying one word about how that H-bomb is delivered after pop-up. Two training-drop altitudes are releasable: the so-called "short-look" at 5,000 feet—and the "long-look" at 15,000 feet. Either of these altitudes is well within the deadly fireball of a high-megaton thermonuke—so you can decide for yourself whether our boys are tying parachutes to the egg or holding off its fury with a delayed fuze until the B-52 can get in the clear.

The same opaque wall of security hides the "on-target countermeasures" we might take against heat-seeking or radar-guided missiles launched by the enemy once our big bombers leave the deck. We know that radar chaff—light ribbons of aluminum foil—will form a radar curtain through which radar missiles cannot find their way. We also know that a rain shower can block a heat-seeker from its hot-tailpipe target. But obviously we cannot hope for convenient rain showers on a given day at a given point. So our scientists may have figured out a way to fake out the heat-seekers, too. If so, it's a dark secret. It's no secret, of course, that the B-52 can penetrate enemy country with great effectiveness while on the deck, under radar screens, so the H-bomb would certainly get fairly close to its target, no matter what the crew must do to protect itself at the end of the road.

**Preflight check.** Now, instead of writing an exposition on this low-level run, I'd like to take you along on one. You'll ride in the jump seat behind Aircraft Commander Gerald McKay, USAF, as he penetrates the Hangover Range, in northern New England. Major McKay is an instructor pilot, which means he knows the B-52 from air scoop to tail guns. Let's walk around with him as he makes his preflight check. With a flashlight he peers into the dark maws of the J-57 jet engines. You notice that sizable bites have been filed out of some of the blades in the compressor—and remark about it.

*[Continued on page 210]*



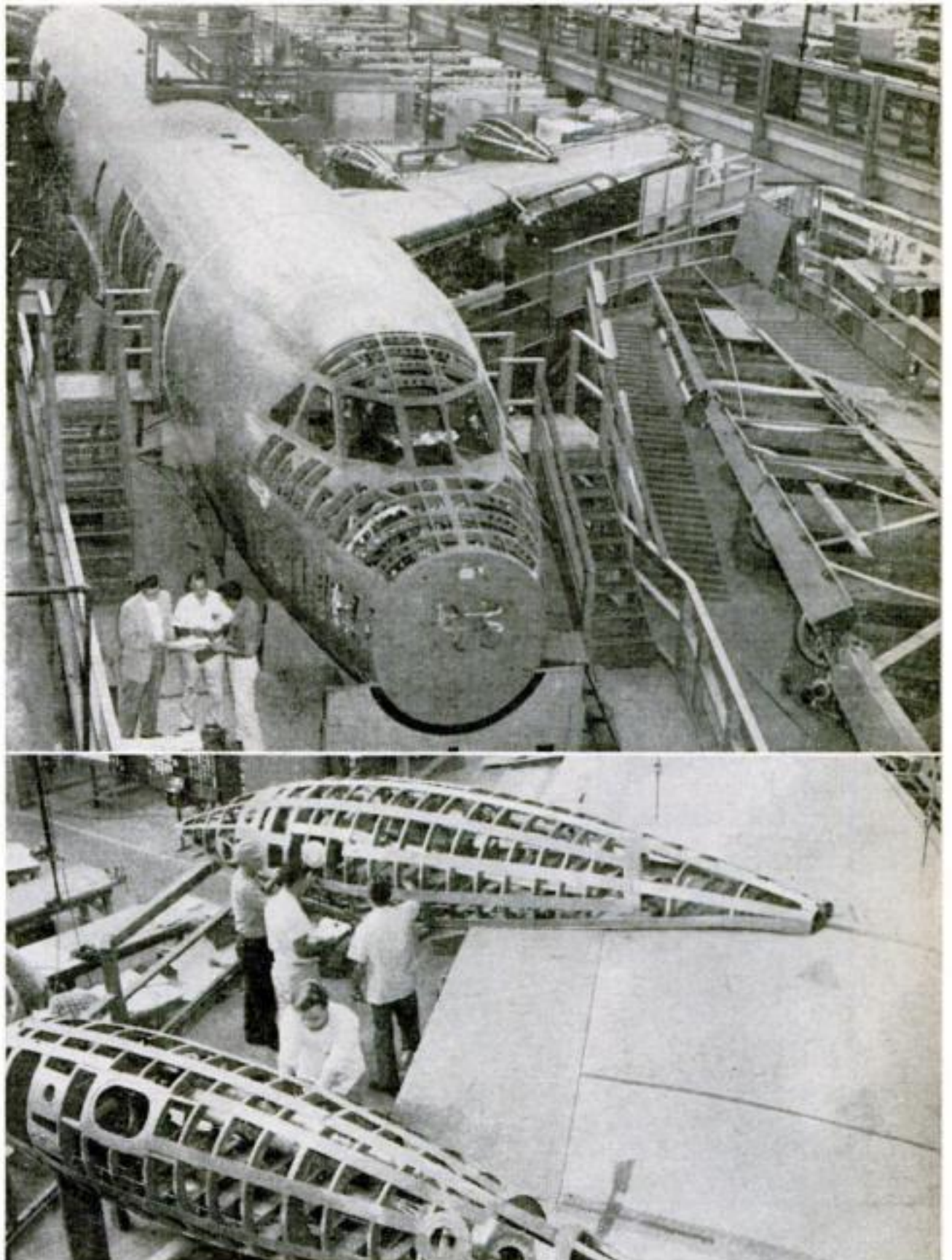
## One-wing jet mock-up

This full-size metal dummy of the up-coming Convair 600 jetliner will never fly—or get its second wing.

Only partially covered with skin, it will be used to test design changes during the production life of the aircraft, and to check uniformity of wiring, flying controls, and instrumentation. Capsules on the wing trailing edge are designed to help the 600 fly 635 m.p.h.

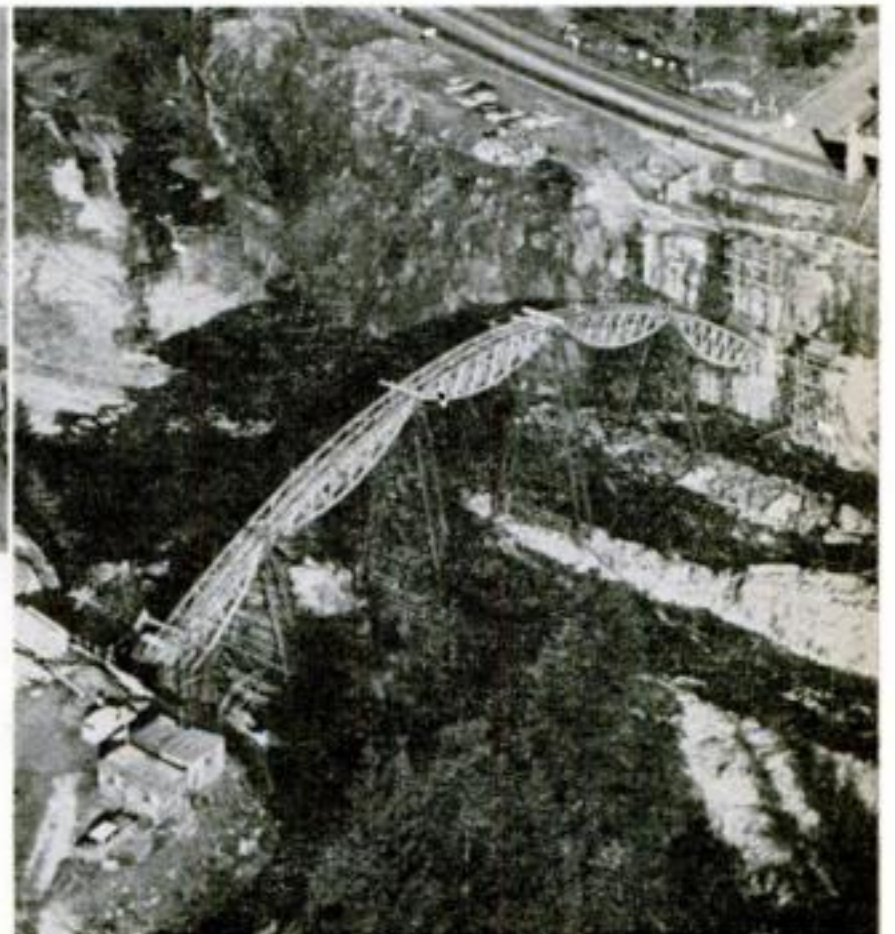
The new Convair, a larger and faster version of the Convair 880, is expected to go into passenger service next year.

**SPEED CAPSULES** at right, shown without skins, look like inverted canoes. They will delay formation of supersonic shock waves that cause drag. They are also fuel-carrying tanks.



## Upside-down bridge

What looks like bridge trusses being built upside down (right) are the wood forms for pouring a concrete arch. Sketch above shows how the bridge will appear when completed across the Capilano River in Vancouver. Its 347-foot span will be the longest of its kind in Canada.

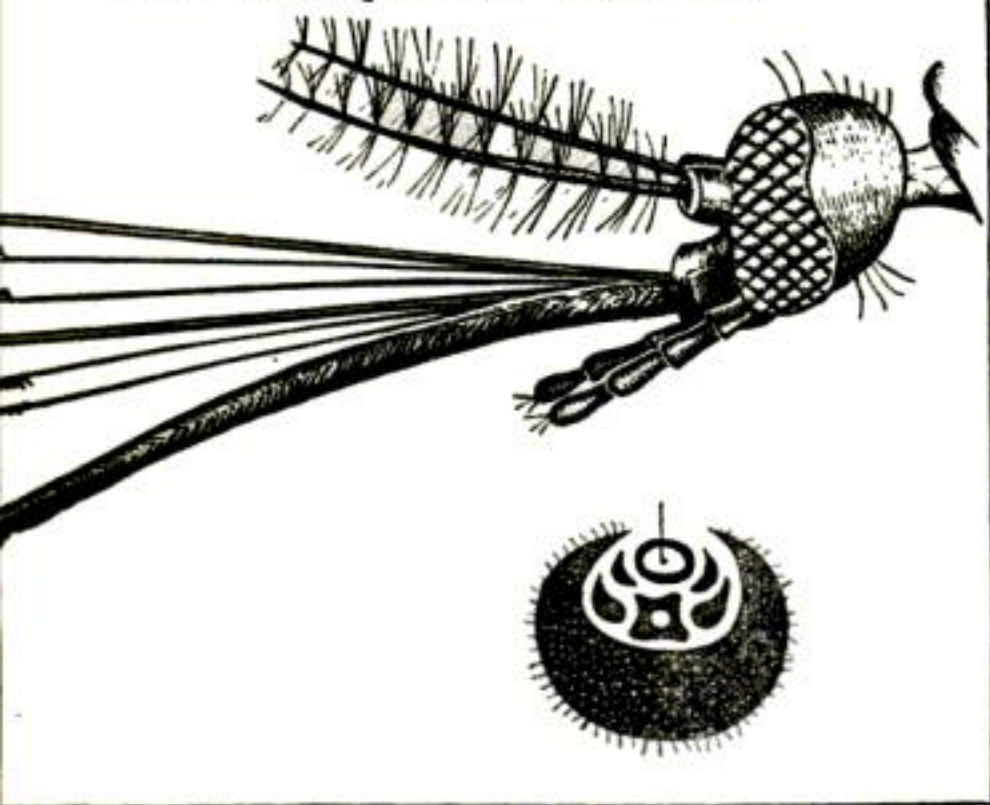




**That pesky but remarkable mechanism...**

# The Mosquito

## The Mosquito's Tool Kit



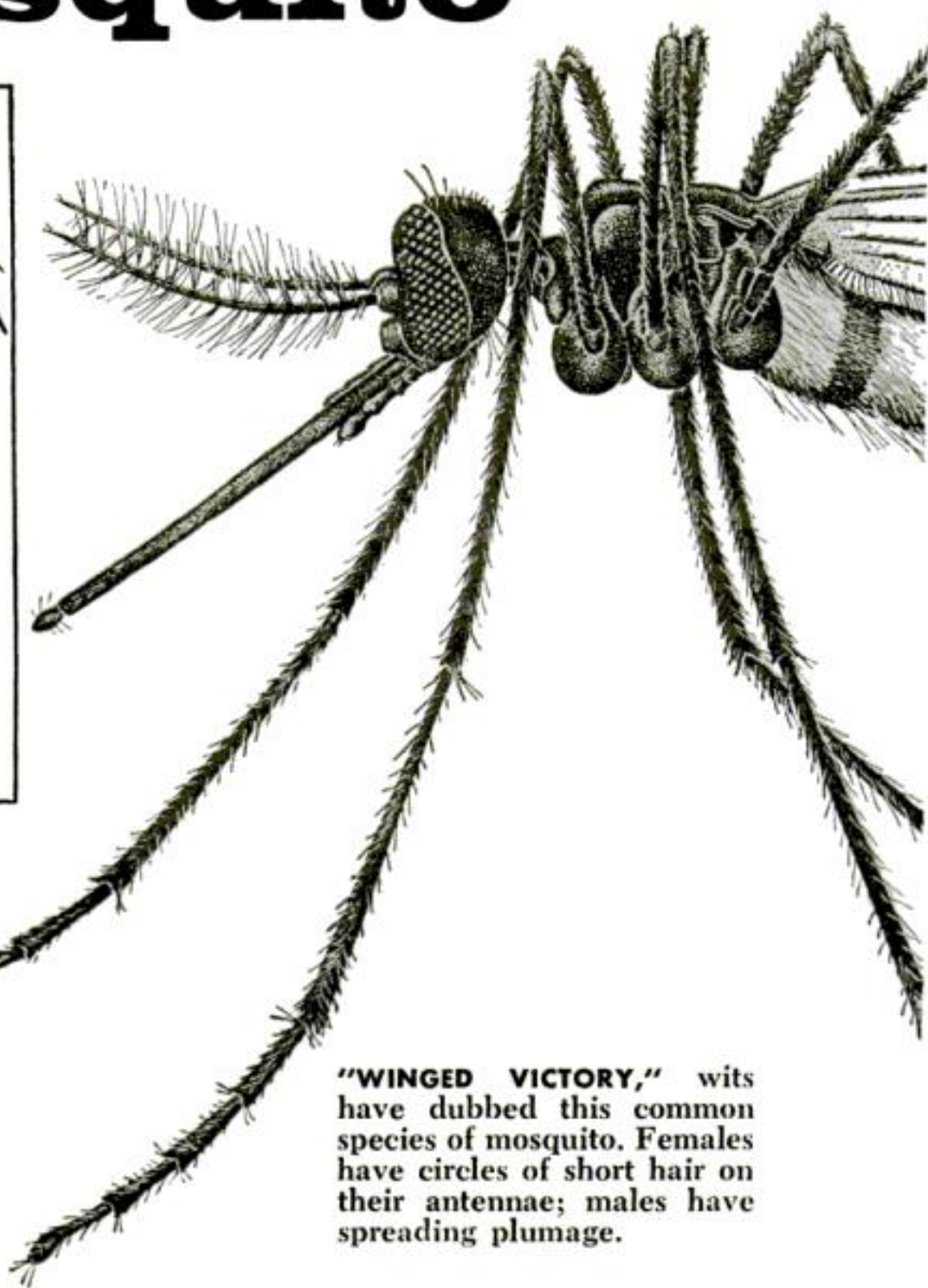
**DEADLY DISSECTING KIT** carried by mosquito in its beak is shown in side and cross-section views.

**Nobody loves this sleep-destroying marauder, but you've got to admire her as a wonderful flying machine**

**By Joan Steen**

**M**OSQUITOES don't bite. They're toothless. They dissect you instead, wielding a pair of saws, lancets, and syringes with fiendish skill. Squash one—in the one time in a dozen you succeed—and the blood smear is burial ground for a more delicate kit of surgical tools than man has ever made.

**Dinner is served.** First thing the hungry mosquito does is to stake out a claim on her victim. (The one that draws blood is the female.) She uses long feelers for this, searching for a soft, blood-rich spot. On target, with a needle-sharp beak as guide, she pricks the skin with the two saws and two lancets that are sheathed in her lower lip. As these instruments enter the blood vessel they push the lip pouch back, clearing the decks for action.



**"WINGED VICTORY,"** wits have dubbed this common species of mosquito. Females have circles of short hair on their antennae; males have spreading plumage.

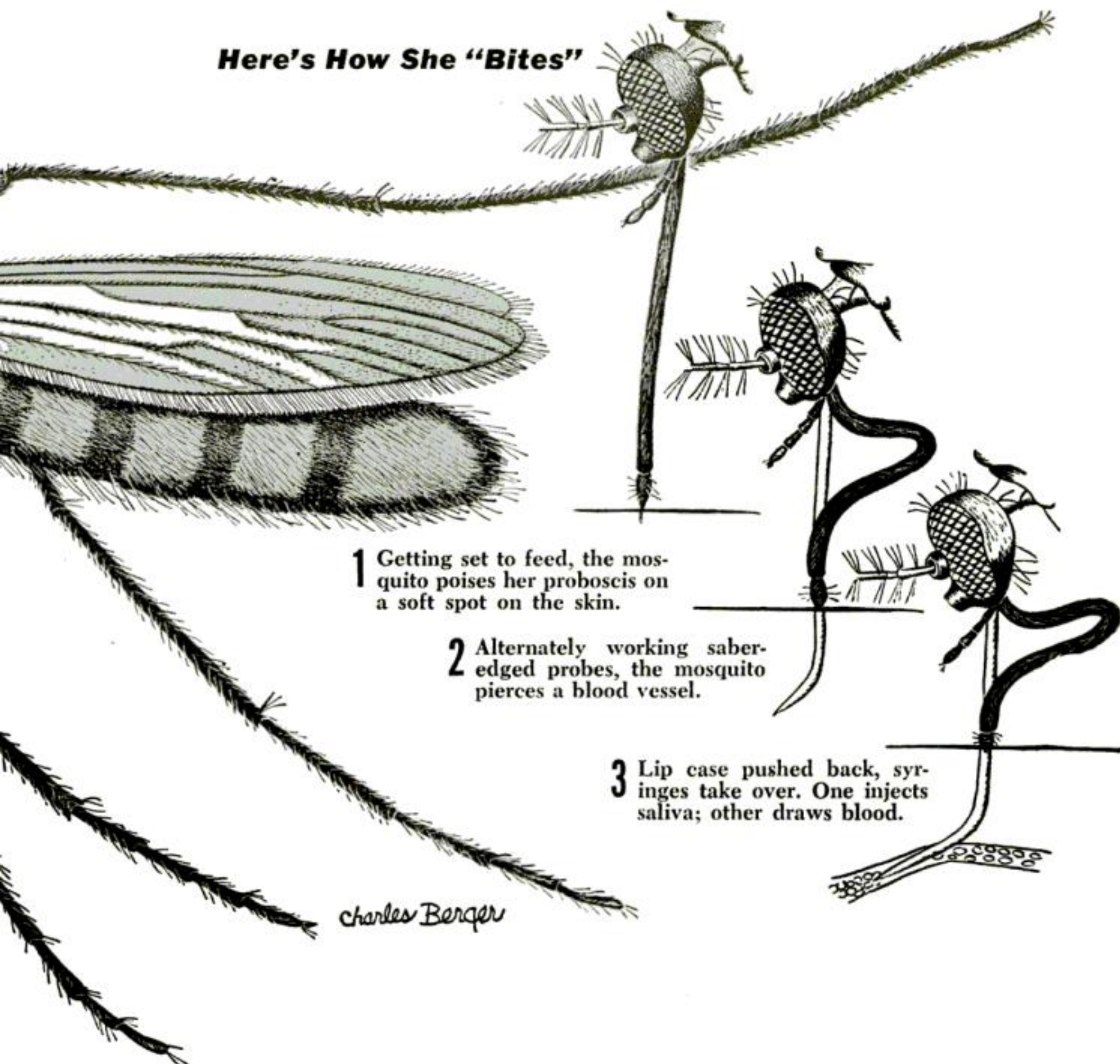
Then the syringes go to work. Syringe No. 1 injects saliva containing an anti-coagulant (to keep the blood liquid). Syringe No. 2 sucks up the blood until the mosquito's body is red and distended.

**Early-warning system.** As if slaking a thirst for blood weren't enough, mosquitoes seem to delight in warning victims with their high, whining hum. But this is not mental cruelty; the mosquito can't help it. The sound is generated by very rapid wing vibrations, generally between 160 and 190 a second, but well over 500 in some species.

These superfast wing beats are part of the mosquito's impressive flight mechanics. Most airborne insects use two pairs of wings. Mosquitoes get along with just one. But a powerful pair it is. In males



## Here's How She "Bites"



1 Getting set to feed, the mosquito poises her proboscis on a soft spot on the skin.

2 Alternately working saber-edged probes, the mosquito pierces a blood vessel.

3 Lip case pushed back, syringes take over. One injects saliva; other draws blood.

Charles Berger

(non-blood-sucking, and inferior in all respects except flight), the wing muscles claim close to a fifth of the total body weight. They can vibrate at rates as high as 587 times a second, and send the critters darting through space at a 100-inch-per-second clip.

**Mysterious thorax.** The nerves and muscles that control flight are housed in the thorax, second of the three divisions of the mosquito's body. Dr. R. E. Snodgrass of the Smithsonian Institution in Washington, commenting on the simplicity and efficiency of this organ, says that it may be "the most remarkable anatomical mechanism developed anywhere in the animal kingdom." Scientists wish they knew how it worked.

The mosquito's legs, its other means

of locomotion, are exceptionally long and slender. Some species have padded feet; others have a hairy heel-like swelling at the base of their claws. Either way, they enable the insect to cope with smooth vertical surfaces. It can cling with ease to window panes or the sides of glass jars.

**Pest and plague.** Mosquitoes have long been considered one of man's worst afflictions. Even today, malaria—carried by the anopheles mosquito—infects two hundred million people throughout the world. Two million die of it annually.

It is now under control in the U. S. But in 1880 the town of Bound Brook, N. J., indicted a pond as a malaria source. The pond was formally brought to trial, found guilty, and its owner ordered to abate the nuisance forthwith.



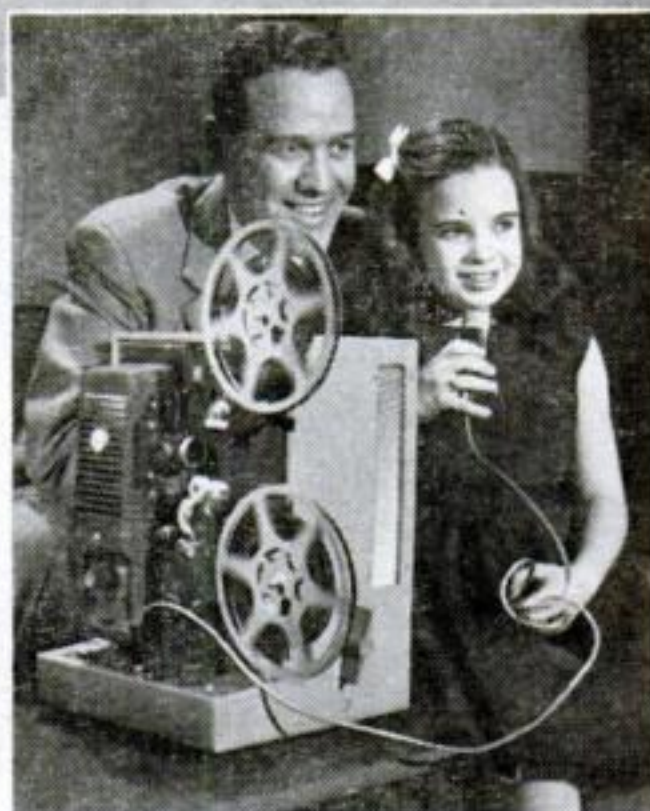


## Sounds and Slides Synchronized

The programer being used above synchronizes a tape recorder and a slide projector. Pressing a button records a signal on tape that, on play-back, causes the slide to change.

The movie projector at right records and reproduces sound on eight-mm. film. Kodak puts the sound track on after you take the movie; then you add music, narration, or both.

Slide programer, \$95; movie projector, \$345. Eastman Kodak Co., Rochester, N.Y.



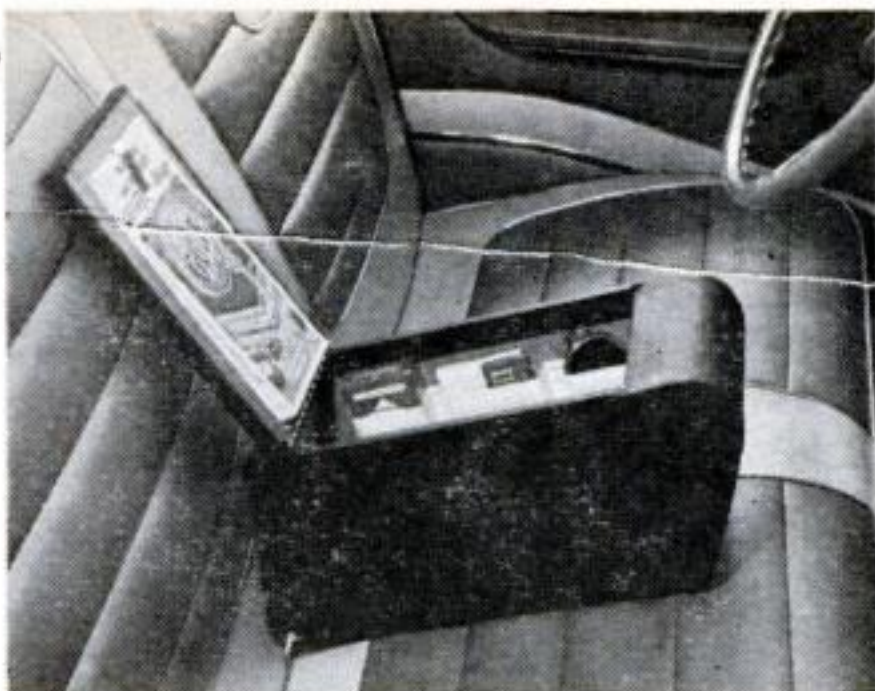
## OUTDOOR GRILL

broils and roasts at the same time on separate racks. It is equipped with a removable motor-driven spit heavy enough to hold a large roast. With stand, \$64.95. Nesco Div., Knapp-Monarch Co., St. Louis Mo.

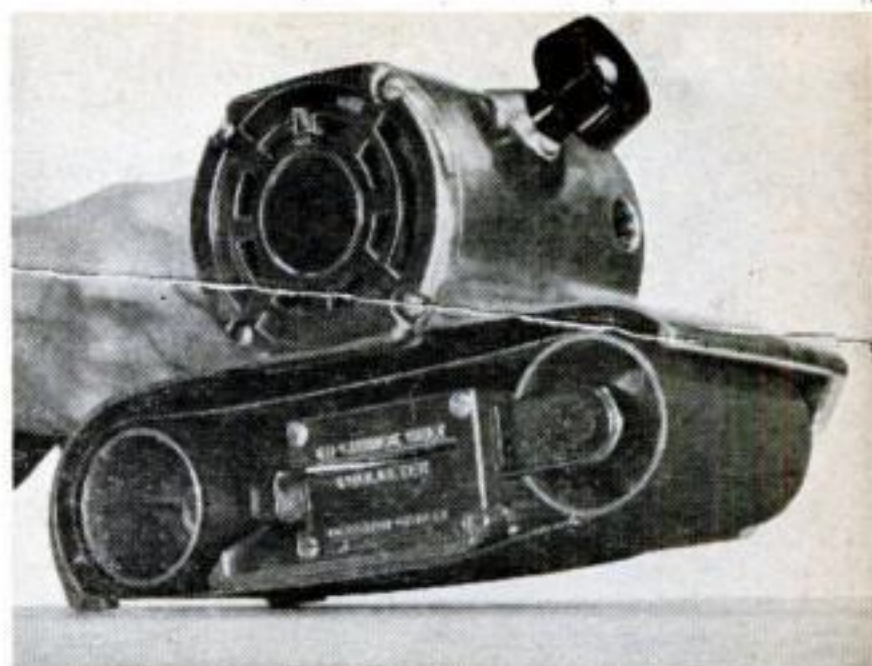
**FOUR HEADS** make the hammer at right more useful than one. Tapered shanks hold them tight; a knockout pin releases them. With nail, plastic, and ball heads, \$4.95; hatchet, \$1.49 extra. Dumas Co., 1 Jackson St., Worcester, Mass.



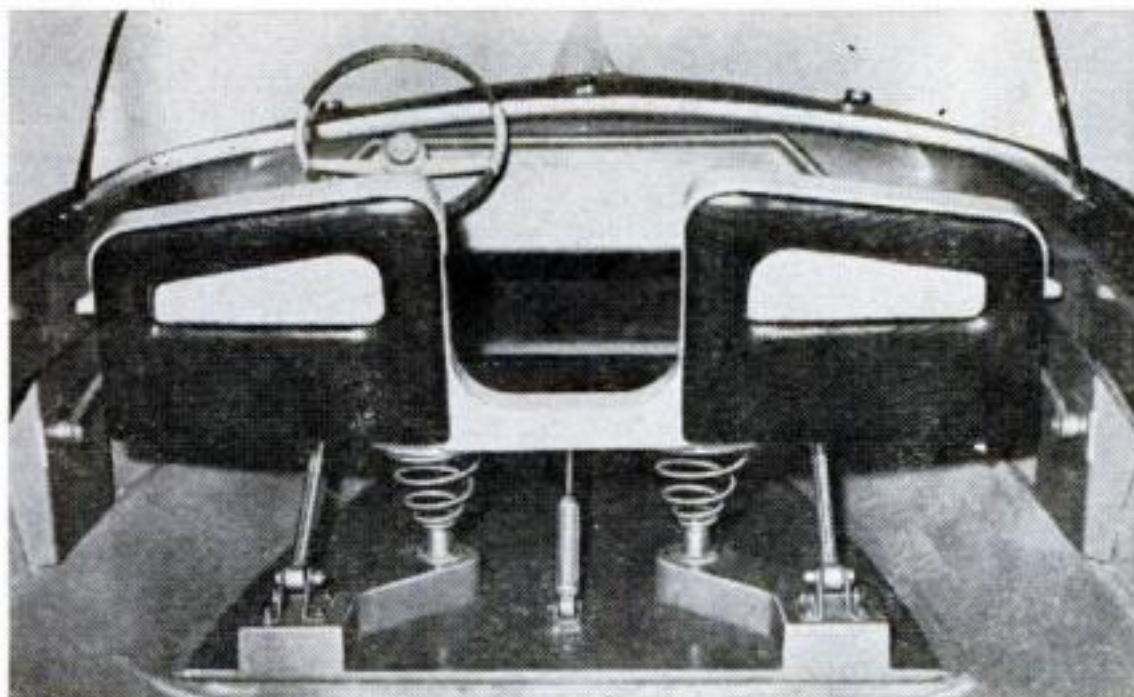




**CAR-SEAT ARM REST** has built-in compartments for cigarettes, tissues, glasses, and a removable coin holder for parking and tolls. A clip on the lid holds maps, and there's room for storing a camera and other items. Car-Y-All sells for \$7.95. Nu-Items Corp., 146-45 Horace Harding Blvd., Flushing, N.Y.



**BELT SANDER** has non-nicking back rest that keeps the rear pulley from digging into stock when you lift up the front end. It will sand flush against baseboards, stair risers, and other right-angle surfaces. Three-inch belt, \$74.50; four-inch belt, \$84.50. Millers Falls Co., Greenfield, Mass.



**HYDRAULIC SEAT** is standard equipment on a line of fiber-glass outboard boats called Hydrodynes by Midwestern Industries Corp., 5315 St. Joe Rd., Fort Wayne, Ind. Or the seat can be bought separately, for your present boat. A kit includes swivel, suspension, seat, and upholstery. It costs \$159. Monroe Auto Equipment Co., 1426 E. First St., Monroe, Mich.



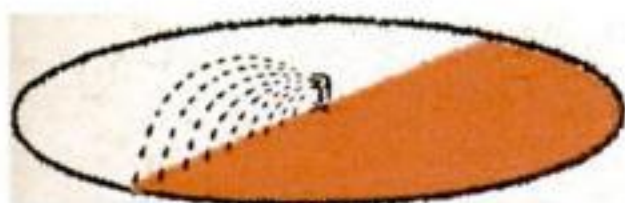
**WASH AND SHINE** come from the squeeze bottle at left. You squirt Holiday on a damp sponge, rub to clean a car, and wipe with a soft cloth to polish. It's for car finishes not "too far gone." S. C. Johnson & Son, Racine, Wis.

**PLASTIC CLIPS** close plastic bags. They're in two parts: a loop through which you slip the neck of a bag, and a collar that slides on and is held by spurs until released by pressing. Pack of 10 for 30 cents. Polytop Corp., Hingham, Mass.





## WHAT'S NEW.....



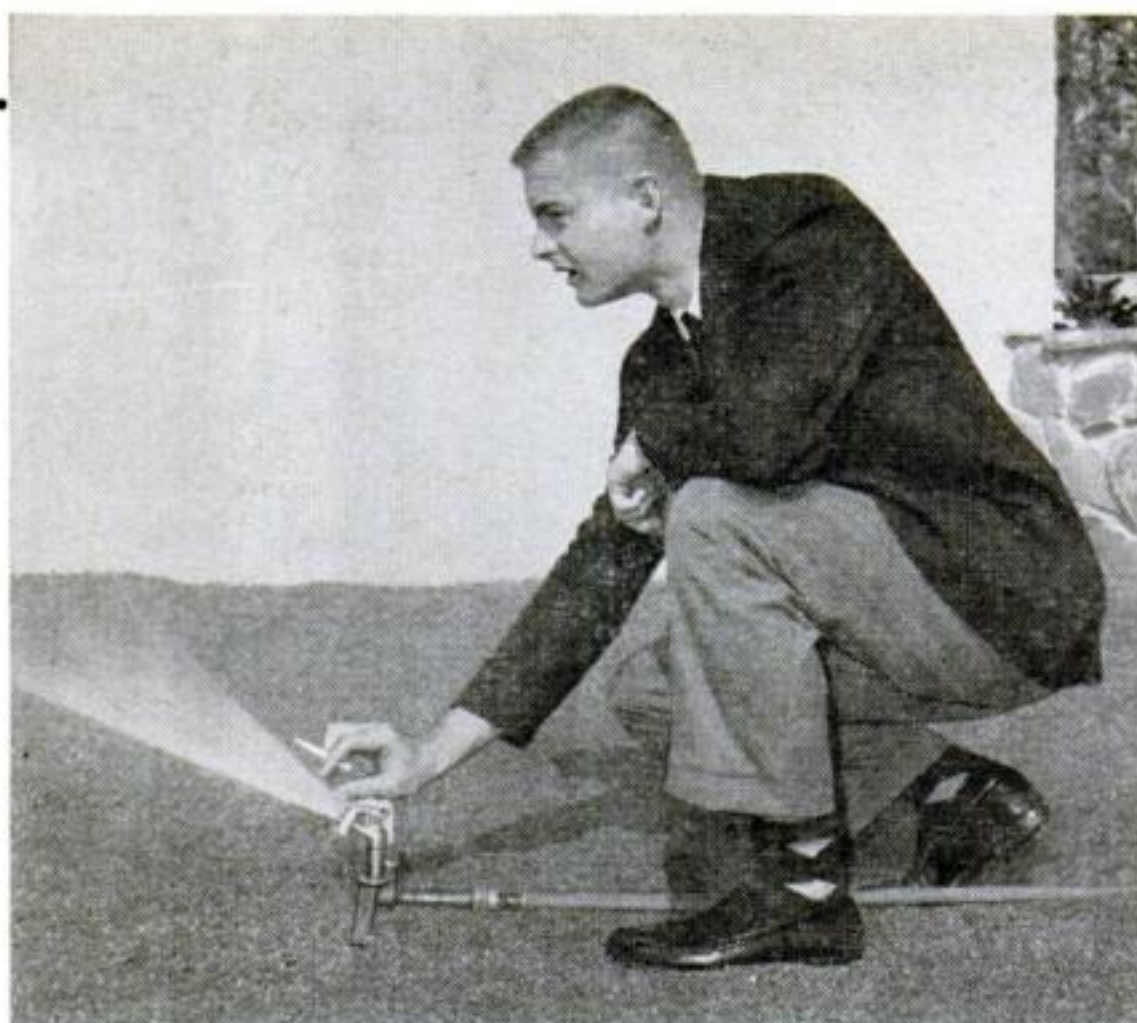
Stops set for segment of circle.



Released for full coverage.



Rectangle: one side, then other.



## Stops on Sprinkler Cover Arc

This sprinkler moves back and forth between stops to water any part of a circle, even a small acute angle, and lets you make adjustments without getting wet. Remove the stops, and it revolves

in a full circle, covering up to a 42-foot radius depending on pressure. It mounts on any base. Chrome, \$6.35; brass, \$6; T-base, \$3.50 extra. Campbell's Mfg. Co., 446 N. La Cienega Blvd., Los Angeles.



**WHITE EPOXY** hardens to a white porcelain finish when equal lengths from two tubes are mixed. It bonds to enamel and porcelain bathroom and kitchen fixtures, metals, glass, most plastics, granite, and fabrics. 98 cents. Devcon Corp., Danvers, Mass.

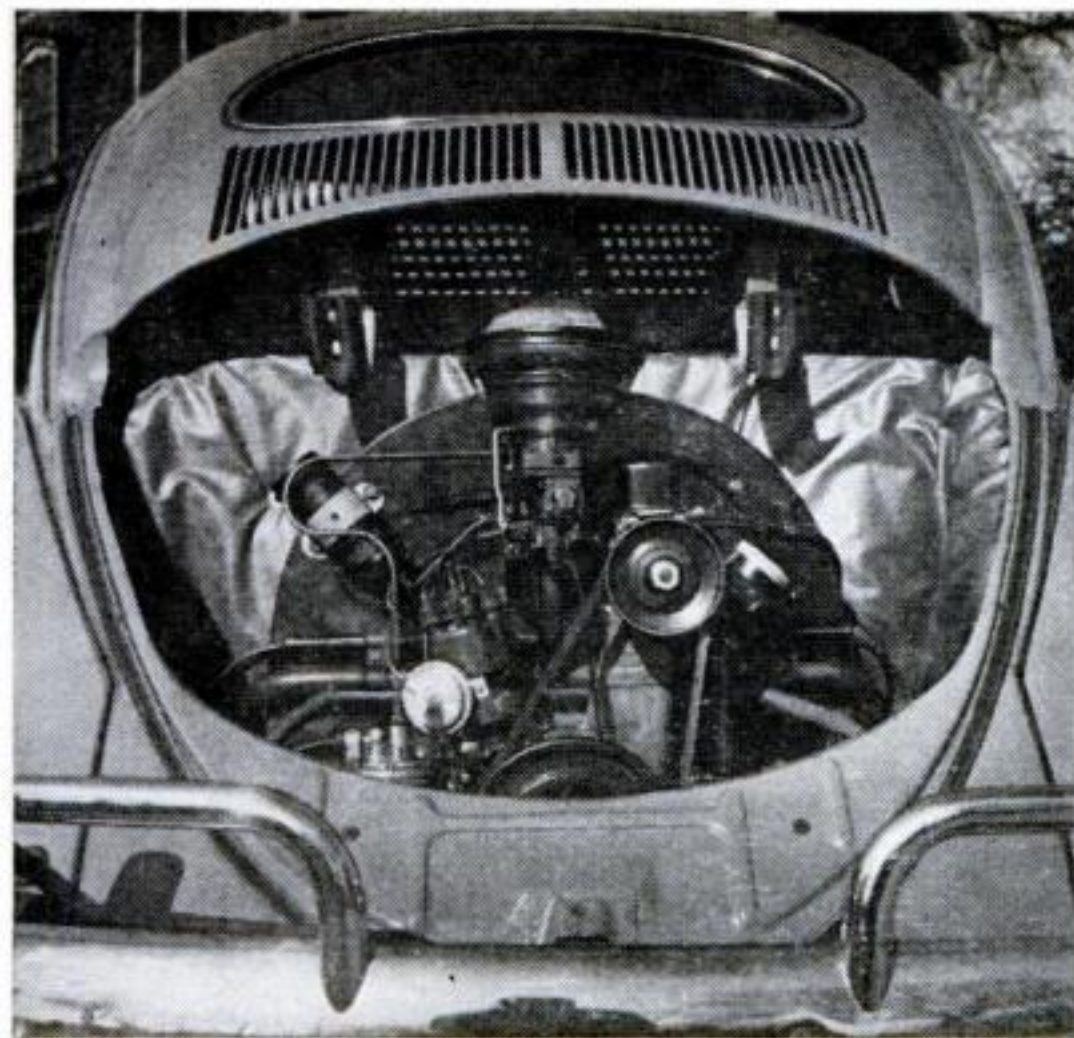


**PLUG VIEWER** lets you examine interior of your spark plugs. A light and magnifying lens show up fouled, chipped, or cracked insulation, and enable you to check the electrode. Power is from two flashlight batteries. \$3.50. Champion Spark Plug Co., Toledo.

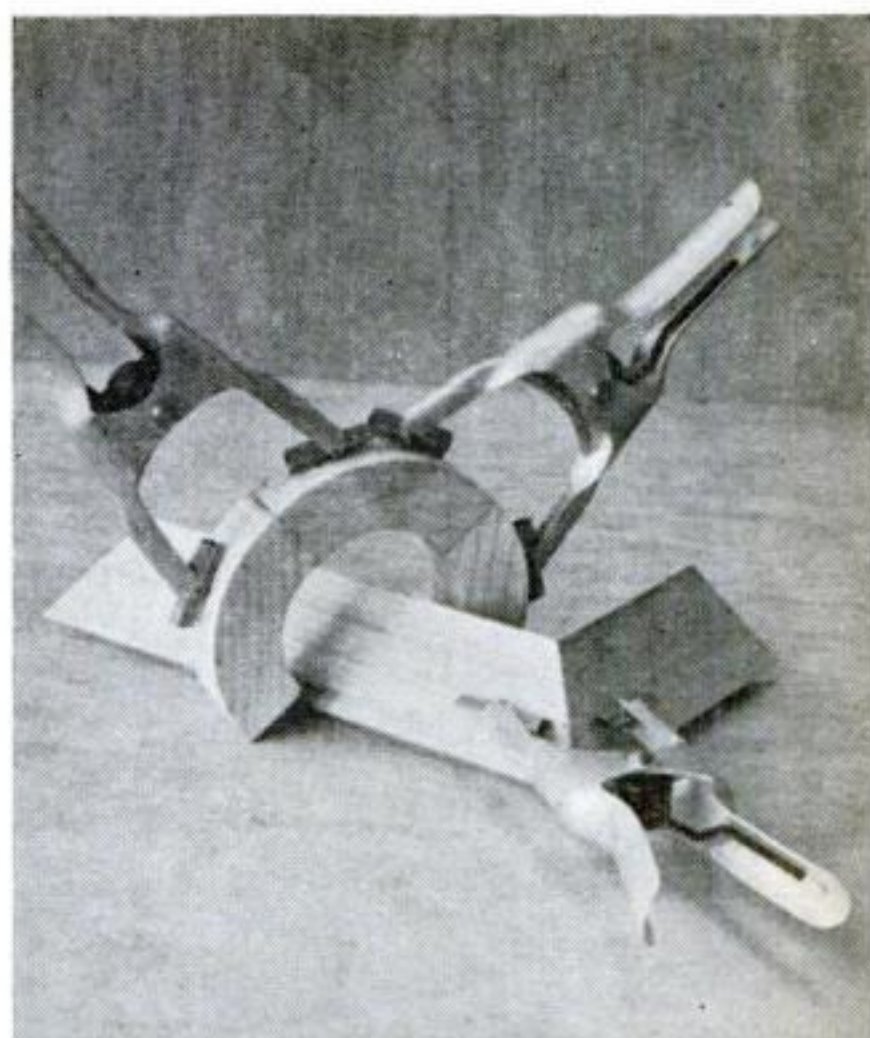


**REPAIR KIT** for eyeglasses contains an optical screwdriver and an assortment of standard screws and nuts for frames. It's useful also for working on watches and other small mechanisms. \$1. Columbia Co., 234 E. Colorado Blvd., Pasadena, Calif.

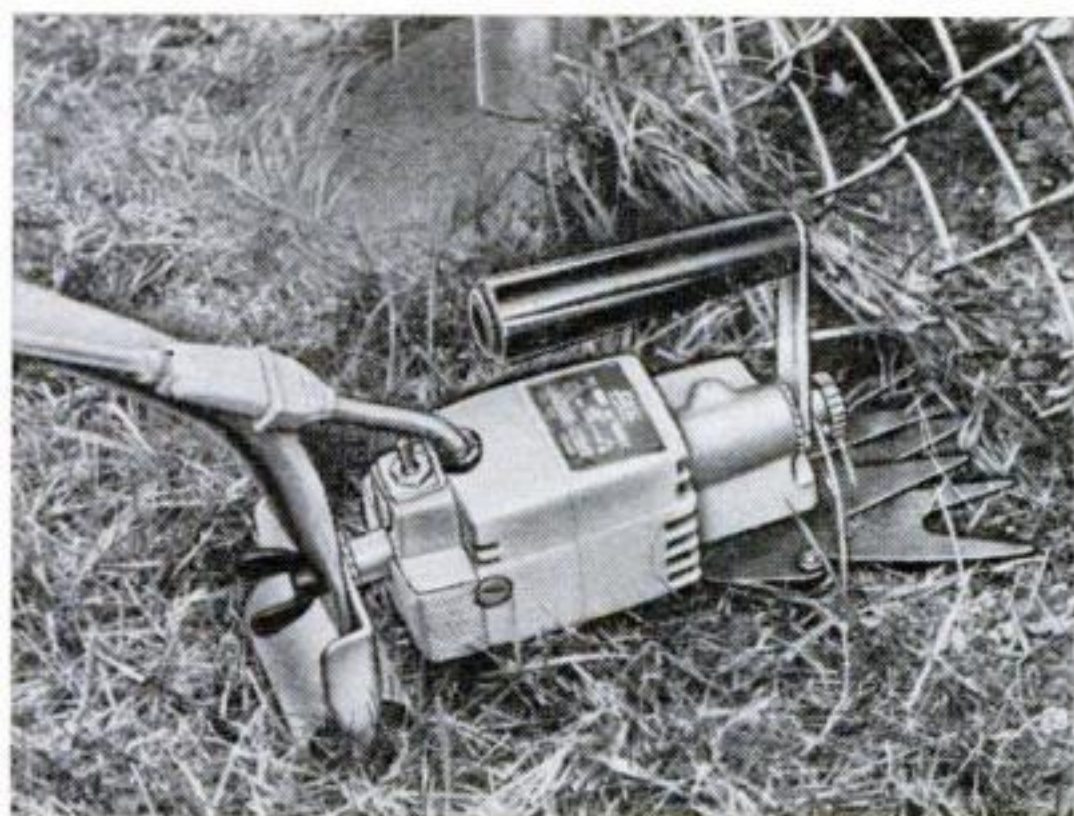




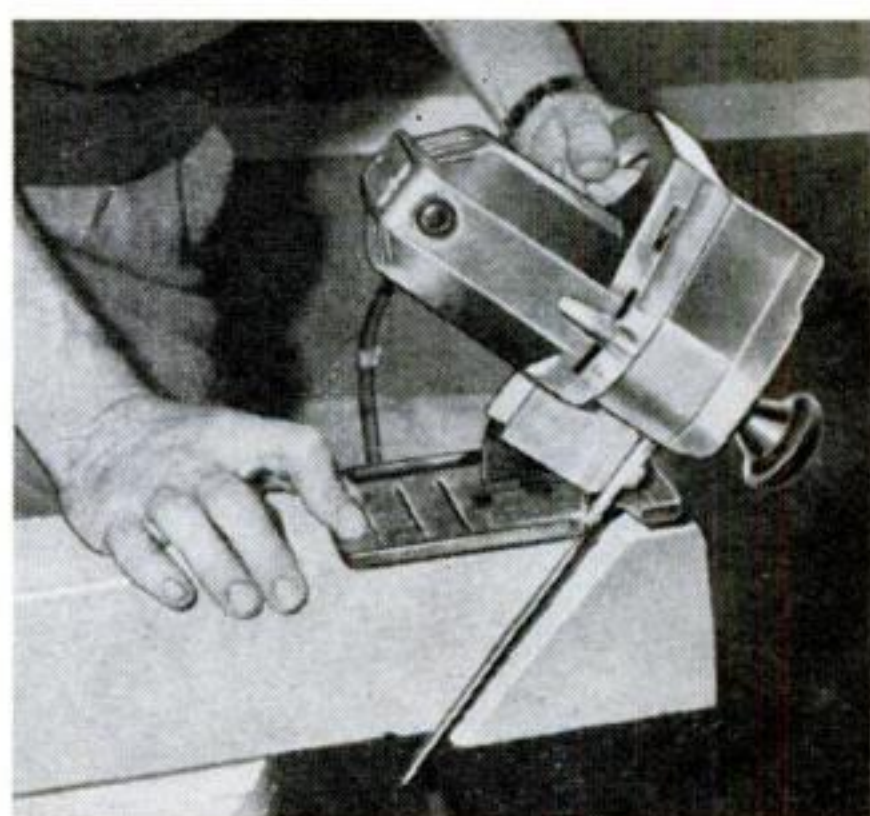
**INSULATION PAD** fits on the fire wall between the engine compartment and rear seat of a Volkswagen. Its heavy filling covered with red and white leath-ette cuts down on both noise and heat from the engine. The pad comes with instructions for installation. Cost \$24. Earle Estes Mfg. Co., Union City, Ga.



**SPRING CLAMP** is equipped with toothed steel jaws that pivot to grip compound miters or other irregularly shaped work. The handles enclose a coil spring that provides 14-pound pressure. Length of jaws is  $1\frac{3}{4}$  inches, width of opening  $3\frac{1}{2}$  inches. \$2.98 each. Arvids Iraids, 5930 Argus Rd., Cincinnati.

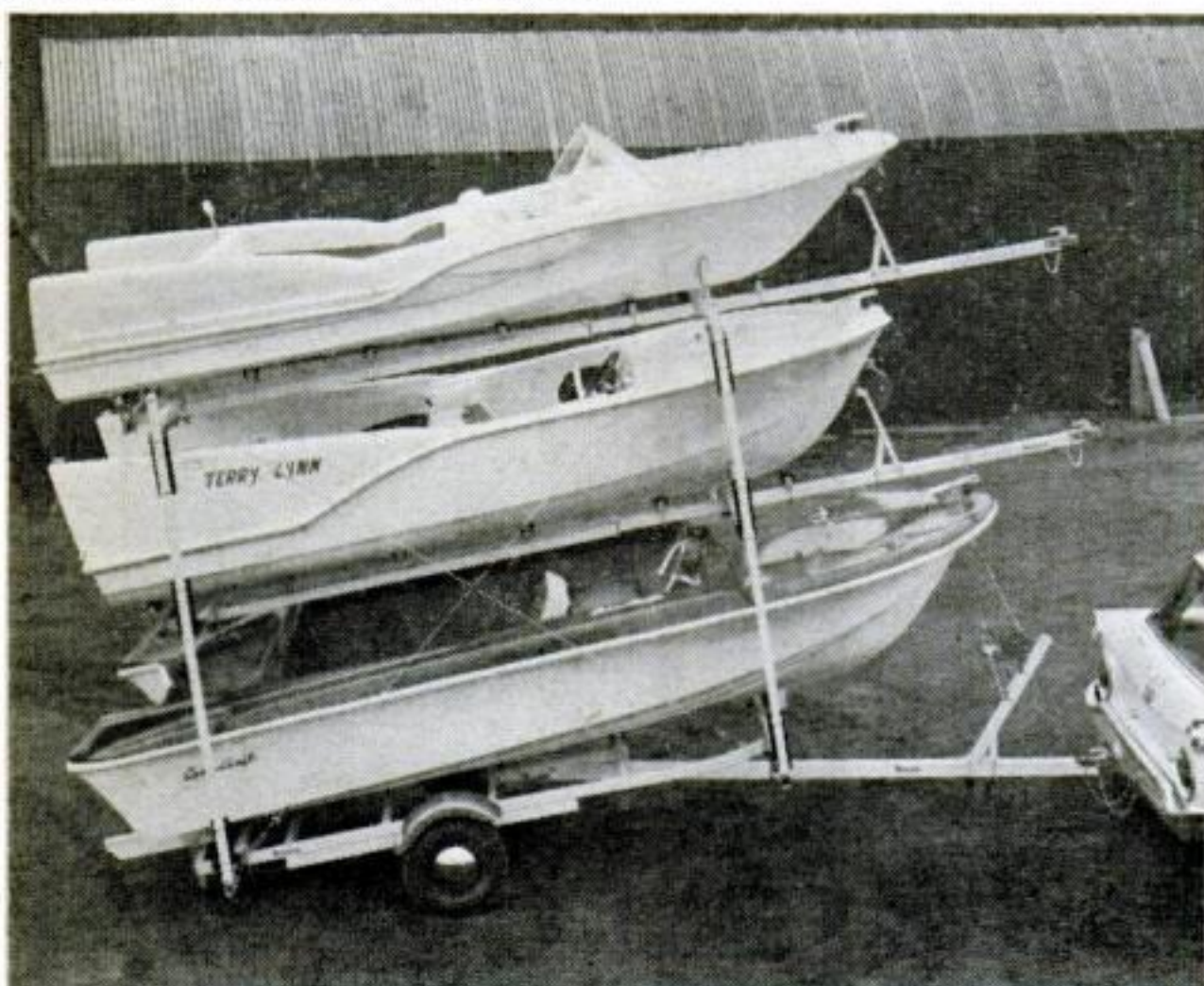


**ELECTRIC CLIPPERS** will cut grass under fences or next to walls, trim edges of sidewalk and flower beds, or shape shrubs and evergreens. Scissor-action blades cut a six-inch swath and are self-sharpening. A slip clutch prevents damage from obstacles caught between them. The tool alone is \$39.95; stand-up roller handle, \$5 extra. Skil Corp., 5033 Elston Ave., Chicago.



**PORTABLE JIGSAW** has a 4.5-amp motor, providing enough power to cut through six-inch lumber or miter the end of a four-by-four. It comes with four wood-cutting blades, one of them  $7\frac{1}{2}$  inches long, and two metal-cutting blades. The jigsaw has a rip guide with provision for circle cutting. It sells for \$49.95. SpeedWay Div.-Thor, 1421 Barnsdale Rd., LaGrange Park, Ill.





### **Three-tiered boat trailer**

For the man who has three boats and only one car, this triple-decker would be just the thing. It was designed, however, not for individual owners, but as a haulaway unit for distributors and dealers. It can be re-assembled at its destination on stowed axles and wheels as three single trailers.

The triple-decker is one of eight trailers in a new Boat-Tote line manufactured by the Hardware Spring Corp. of Detroit.



### **Gamma rays see inside ties**

This nuclear instrument takes guess-work out of detecting hidden flaws in wooden cross ties on the New York Central. It sends low-level, nondangerous gamma rays through a tie and bounces them back to a radiation counter. Rate of reflection shows whether the tie is sound, porous, or rotted inside or underneath. Nuclear Science & Engineering Corp., Pittsburgh, built the tool.



### **Captive helicopter**

Flying at the end of a 78-foot swiveling boom, this helicopter gets off the ground but goes nowhere. It was invented by Leo Jacobs, Canadian engineer, for training helicopter pilots. The simulator, called a Jaycopter, can take off, hover, turn, dip, and land under control from the cockpit. Its rotor and propeller are turned by a three-hp. engine. It could make a hit at a county fair, too.





**FREE  
Blueprint**



**Mechanics  
and Handicraft  
SECTION**

*With the help of child psychologists, teachers, parents,  
and the kids themselves, Popular Science designs—*

# **The Best Playhouse You Can Build**

**By Joan Steen**

**W**E DECIDED to build a playhouse with a difference—not a dollhouse to charm Grandma, or a tool shed to suit Dad. But a practical playhouse, fun for kids.

The kids have now okayed it. Many tried it. All loved it. The materials cost \$242, about half what you might pay for an equivalent store-bought playhouse alone—and you'd get no extra play equipment such as this one has built in.

We had a lot of questions at the start.

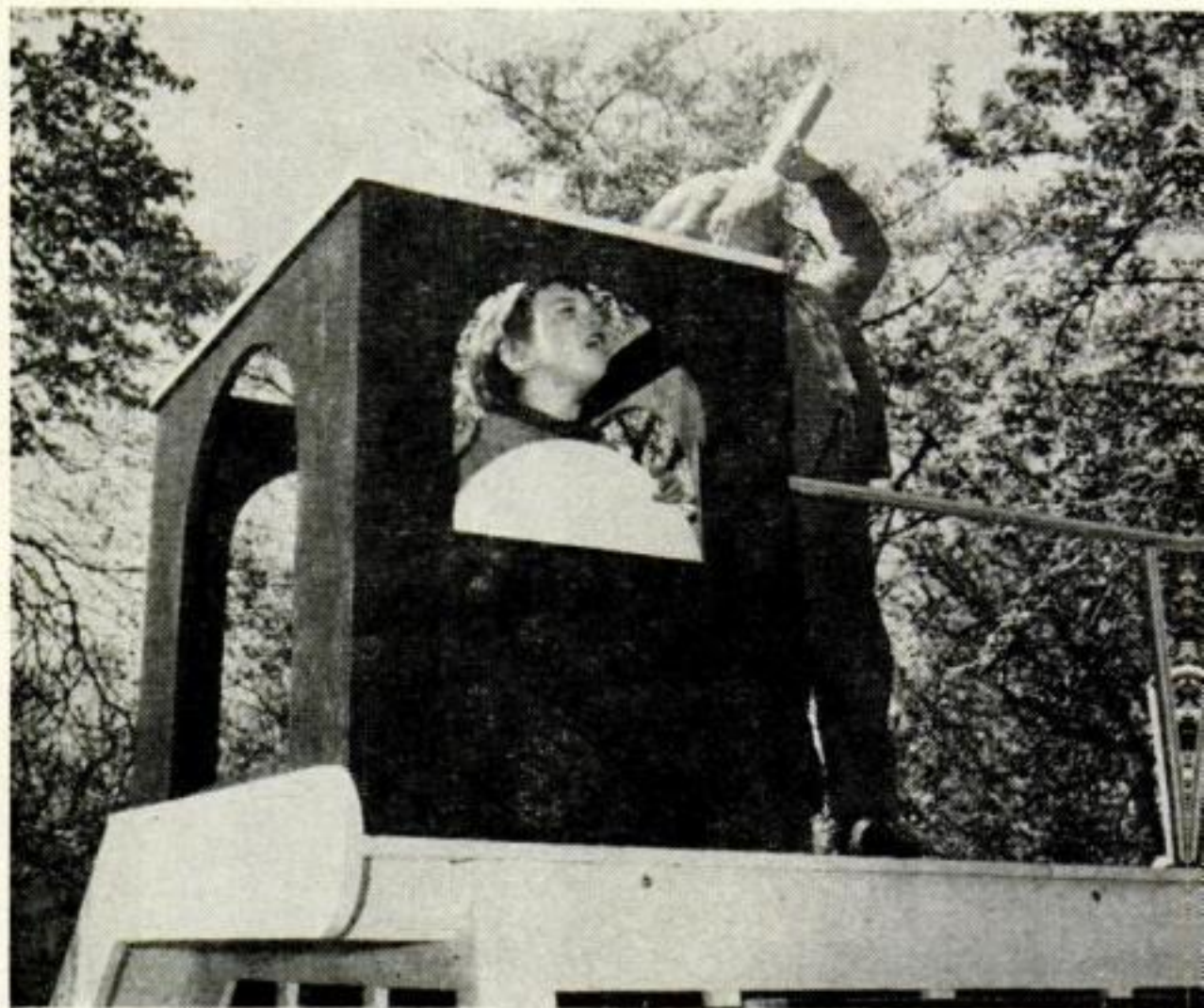
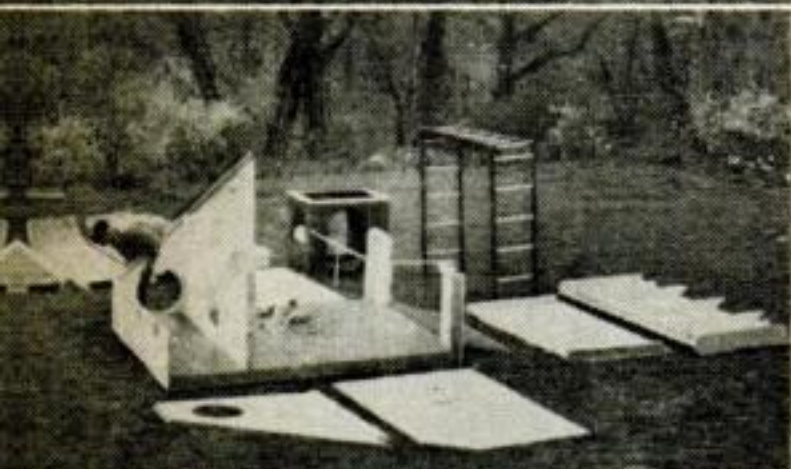
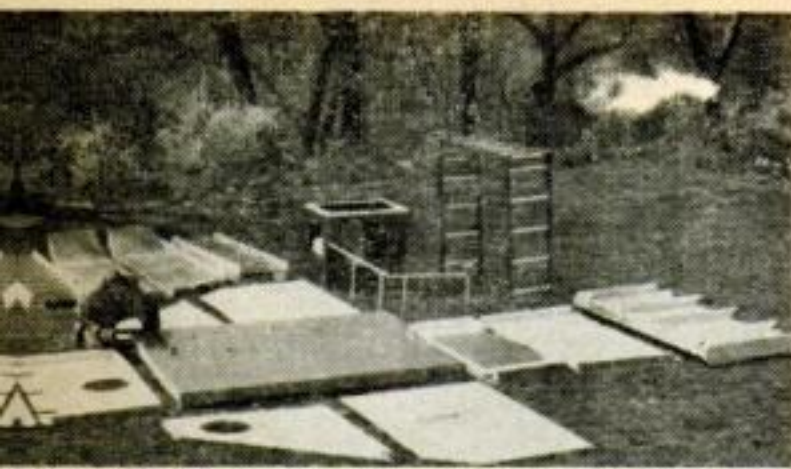
CONTINUED

127

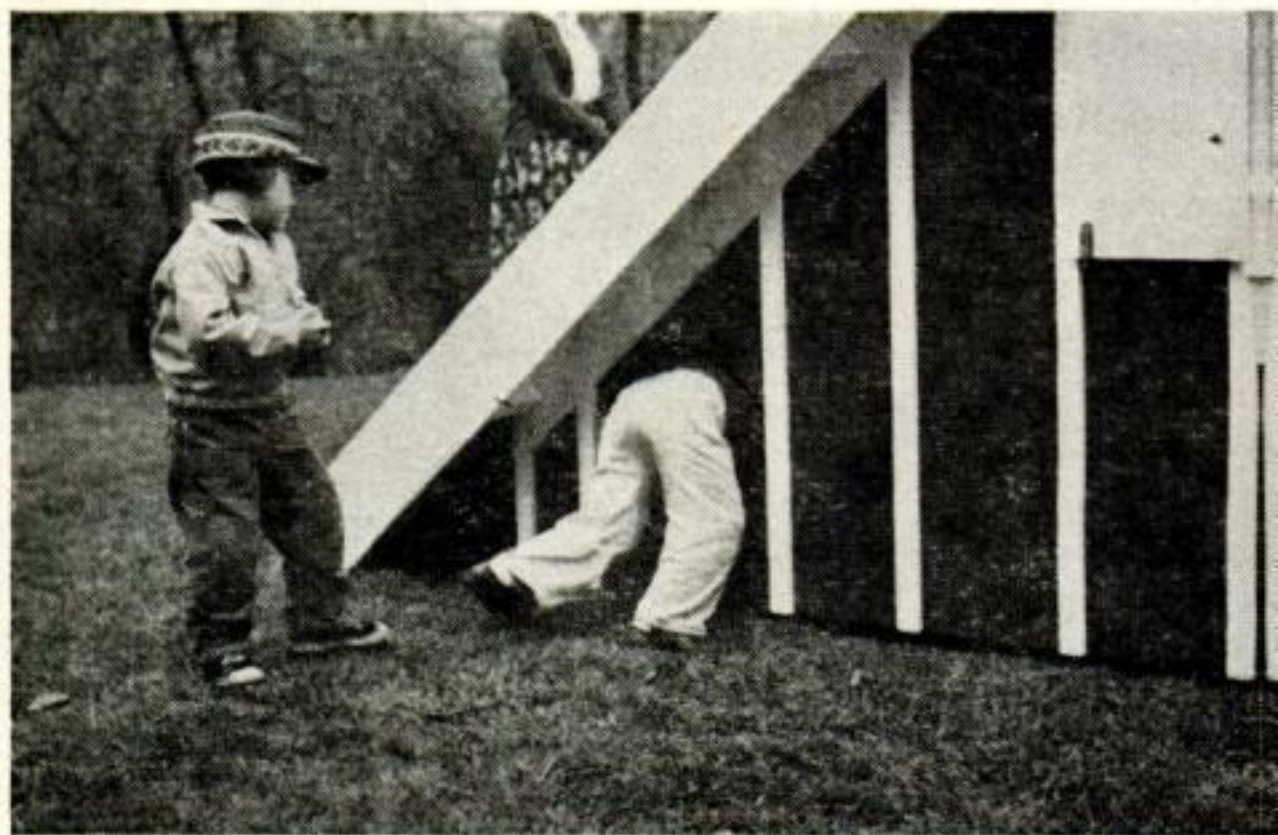


## Prefab it indoors, assemble it on the site

**KNOCKED DOWN**, the house is a stack of parts that are easily handled. If you move, take it with you. Or store it in the garage during the winter. When your kids outgrow it, you could sell it to a neighbor and recover a good part of the money it cost.



*"How many birds?" "Ten," David says. A moment before Sinclair ("Sinny") was steering the boat while David spied pirates. Later? Plane-spotting.*



*Kids were patient taking turns to crawl through the tunnel. They called the dark and snug tunnel a "very secret place."*



What should you build into a playhouse to make it the most fun? How big should it be? For what age kids?

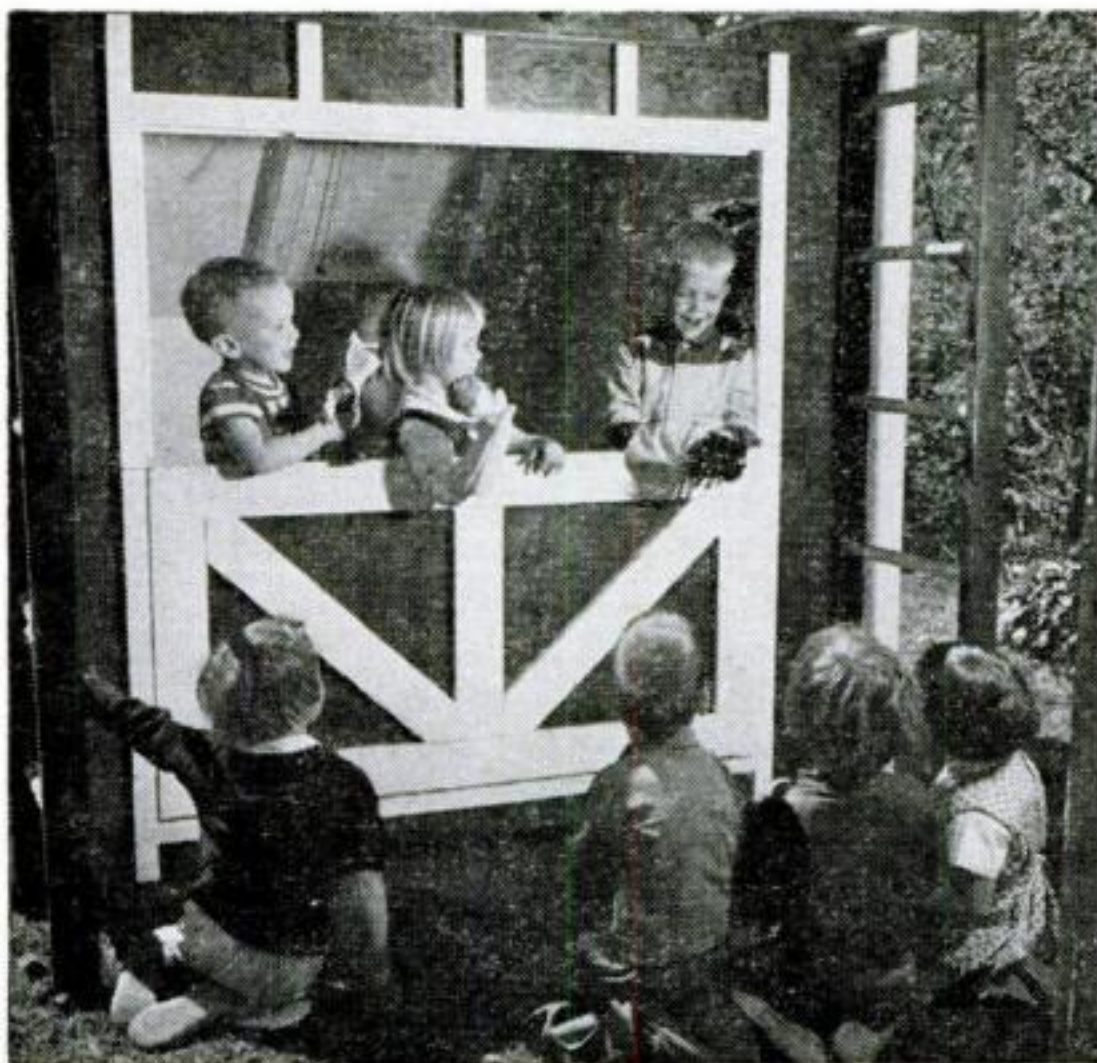
We asked nursery-school teachers, pediatricians, child psychologists. We called on the staff of the famous Gesell Institute of Child Development in New Haven, Conn.

Kids don't need much to have fun, we

were assured. Make the playhouse simple, but design the *outside* to be used as well as the *inside*. That way smaller children could use it as a jungle gym, while four- and five-year-olds (the ideal playhouse age) can explore its house-shop-fort possibilities.

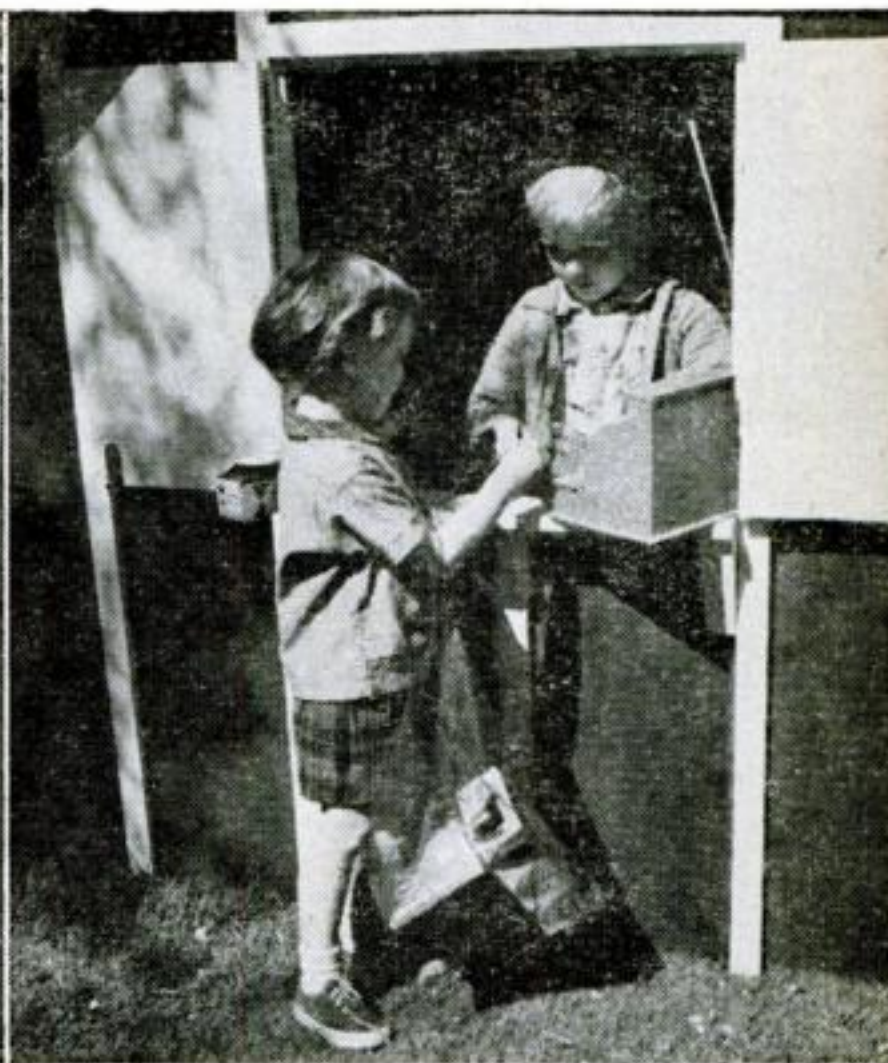
*A slide roof.* So we took our cue from the deep-pitched roof of a New England

CONTINUED



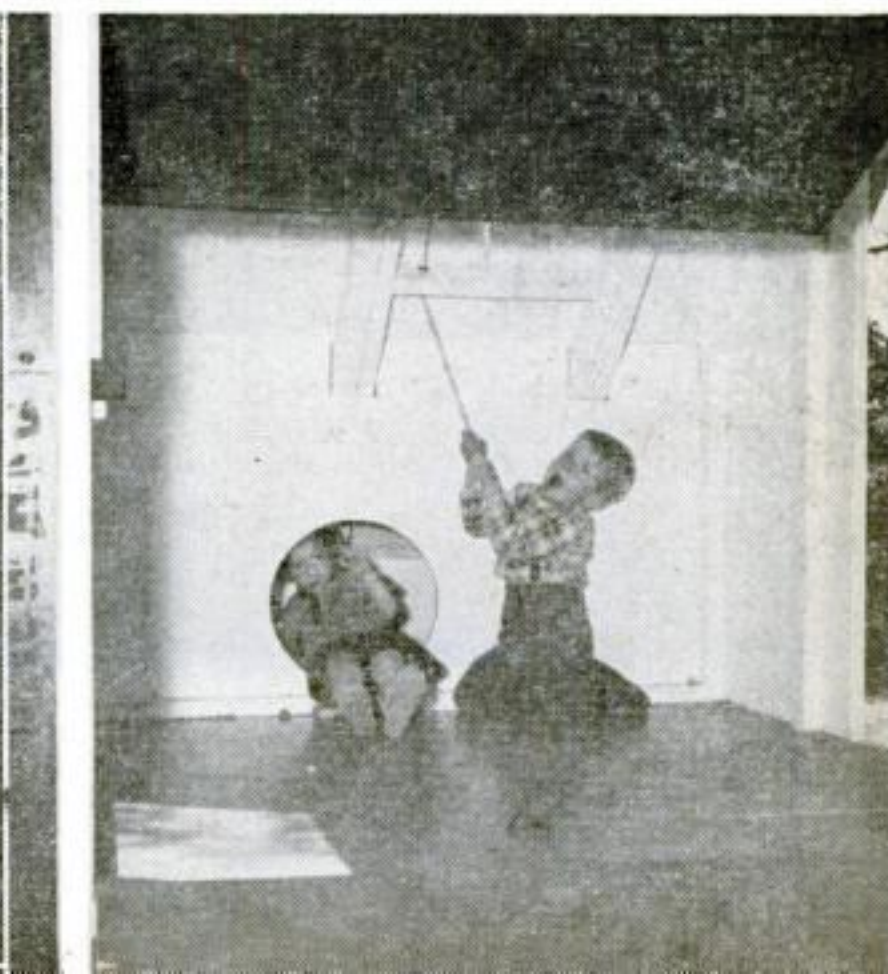
*A rapt audience watches while Captain Hook leers from the hand of the chief puppeteer. Ramp up, the playroom's a puppet theater; down, it's a full stage.*

*A trike garage for some; a house, fort, or castle for others; the playroom's a flexible place. Tow-headed boy is more interested in swinging outside.*

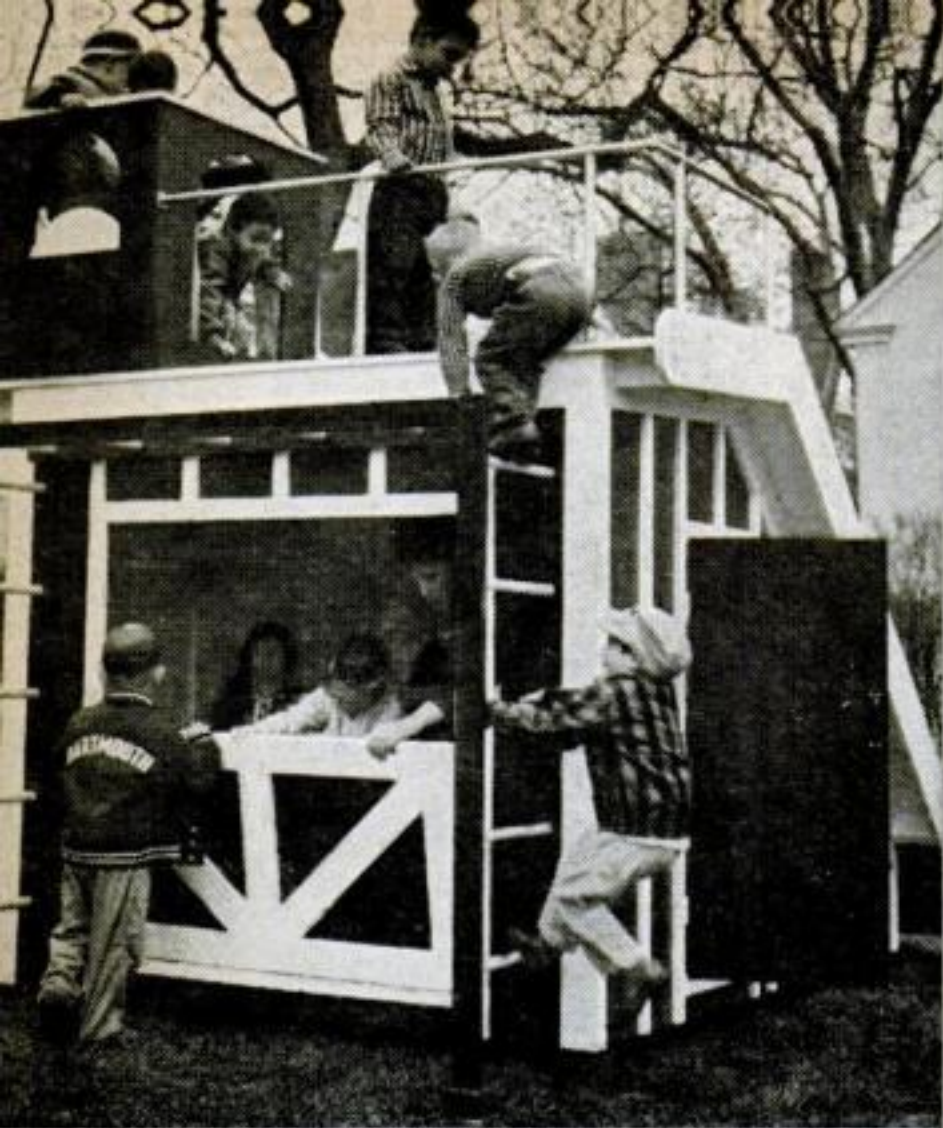


*Sinny pays and David makes change as the playhouse window becomes a store counter. It's fine for crawling in and out of in "cops-and-robbers," too.*

*Sinny ducks through the tunnel as David hoists the door. If he lets go the rope, a clothesline tightener automatically grips it to keep the door from slamming.*







**SUCCESS:** Assembled on the grounds of the Gesell Institute in New Haven, Conn., the POPULAR SCIENCE playhouse was an immediate hit with the children there—as you can see from these pictures. The youngsters swarmed all over it, trying the slides, the lookout, the tunnel, the ladders. The Institute has added the house to its permanent play equipment.

saltbox and made the center of one side of the playhouse roof a slide—nine feet long, sloping at 41 degrees.

A divider down the center makes it two slides. It's fast, and the kids who tried it were thrilled. You might put a mat or cushion at the base as a safeguard, but most kids we saw—and that includes four-year-olds—caught on fast on how to get down gracefully.

*A tower, too.* The other side of the roof we flattened out (allowing a little slope for drainage), and added a tower to it. It's anybody's tower—the battlement of a castle, the bridge of a ship (there's a wheel to turn), a widow's walk—or just a place to be high up and look out.

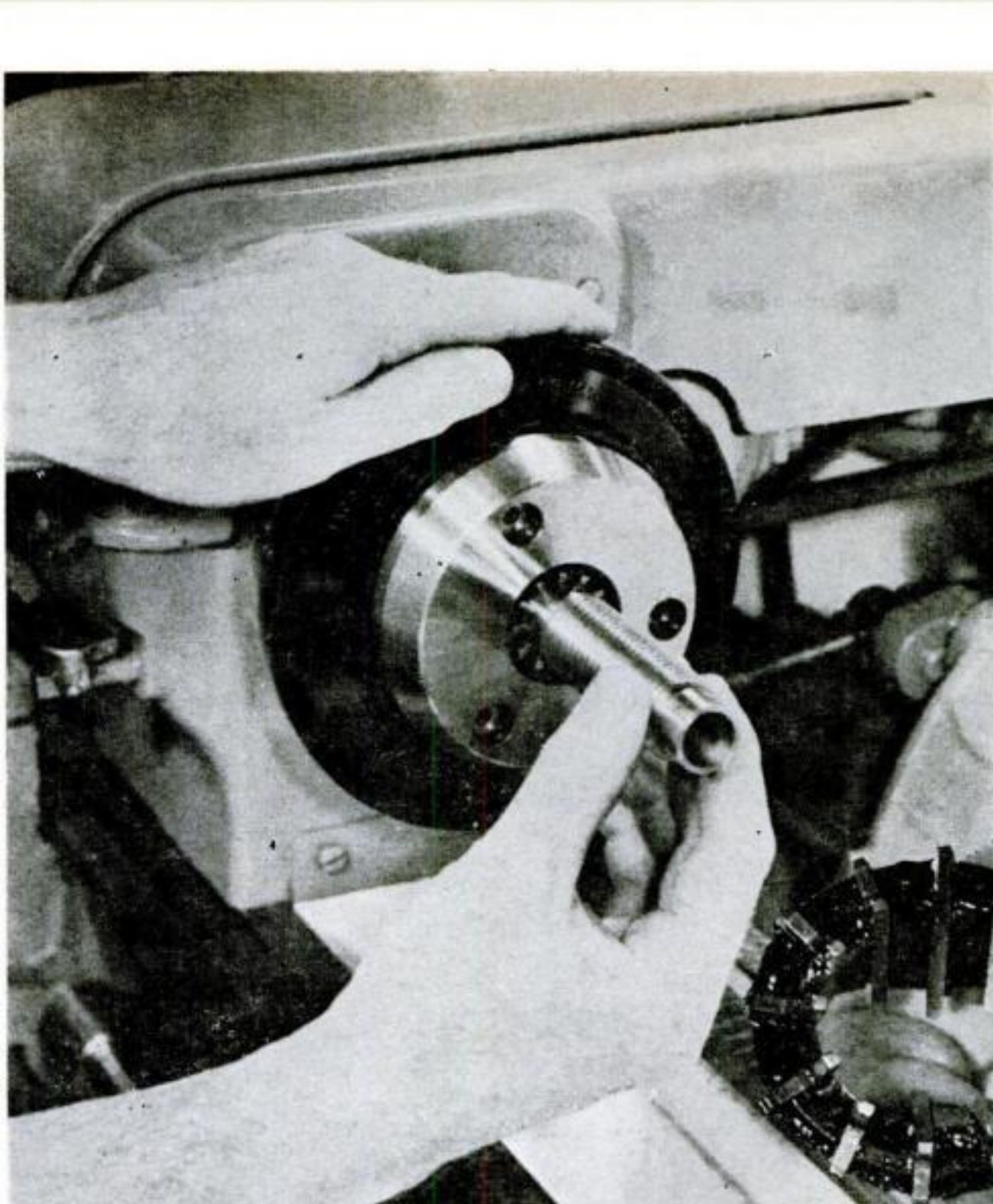
To reach the tower, what else but ladders? We saw little ones deftly maneuver themselves from the rungs of the vertical pieces onto the roof or into the tower. Older children can chin themselves or move hand by hand across the horizontal branch.

At ground level this slightly skewed saltbox has a four-foot-wide Dutch door

*[Continued on page 220]*







# One MACHINIST tells another...

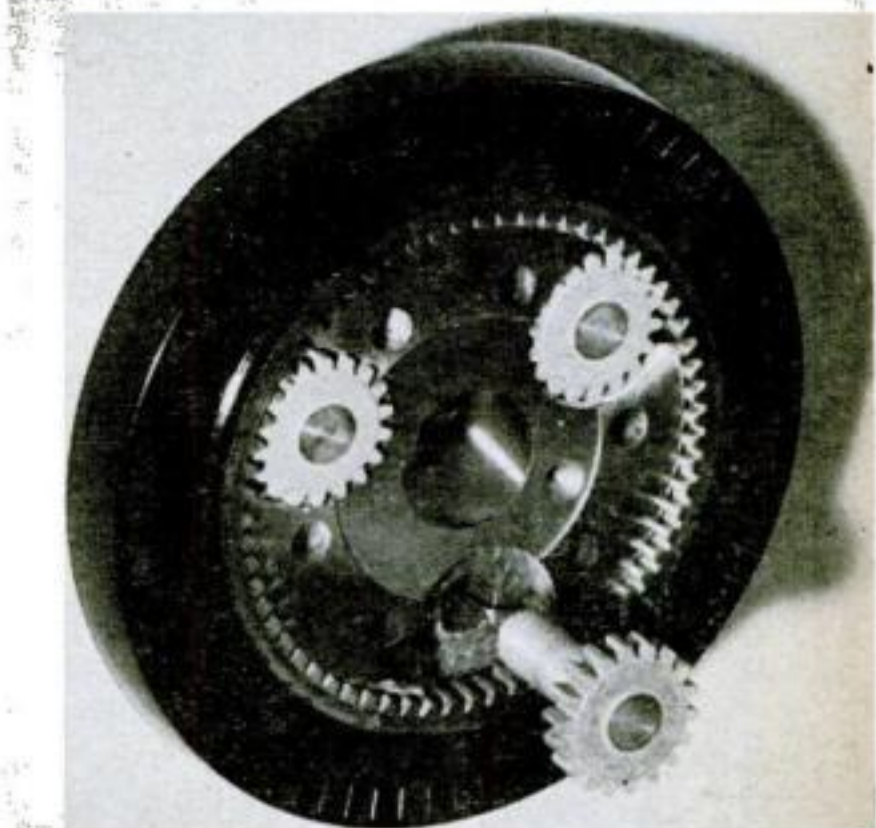
A TWIST OF A HANDWHEEL tightens these flexible synthetic-rubber collets to an accuracy of .001". Hardened-steel jaw segments are molded into the rubber, as shown at right.

## ...these new collets are rubber

NOW you can stop dreaming of equipping your lathe with a full set of collets and do something about it—and you won't have to put your lathe in hock, either, to buy them.

A set of 10 new synthetic-rubber collets just put on the market will handle *all diameters of rod* from  $\frac{3}{32}$ " to  $1\frac{1}{16}$ ". They're made by the Jacobs Manufacturing Co., West Hartford, Conn. (the same people who make the Jacobs key chuck for drills).

Ten of these Rubber-Flex collets cost \$65. You'd need 63 steel collets costing about \$325 to cover the same range. Of course, you'll need a collet chuck (\$70) and an adaptor (\$8) to screw it onto



**THREE BOLTS** with pinion gears for heads are rotated by the ring gear inside the handwheel to pull the chuck nose up tight on the collets. No drawbar through the spindle is needed.

CONTINUED

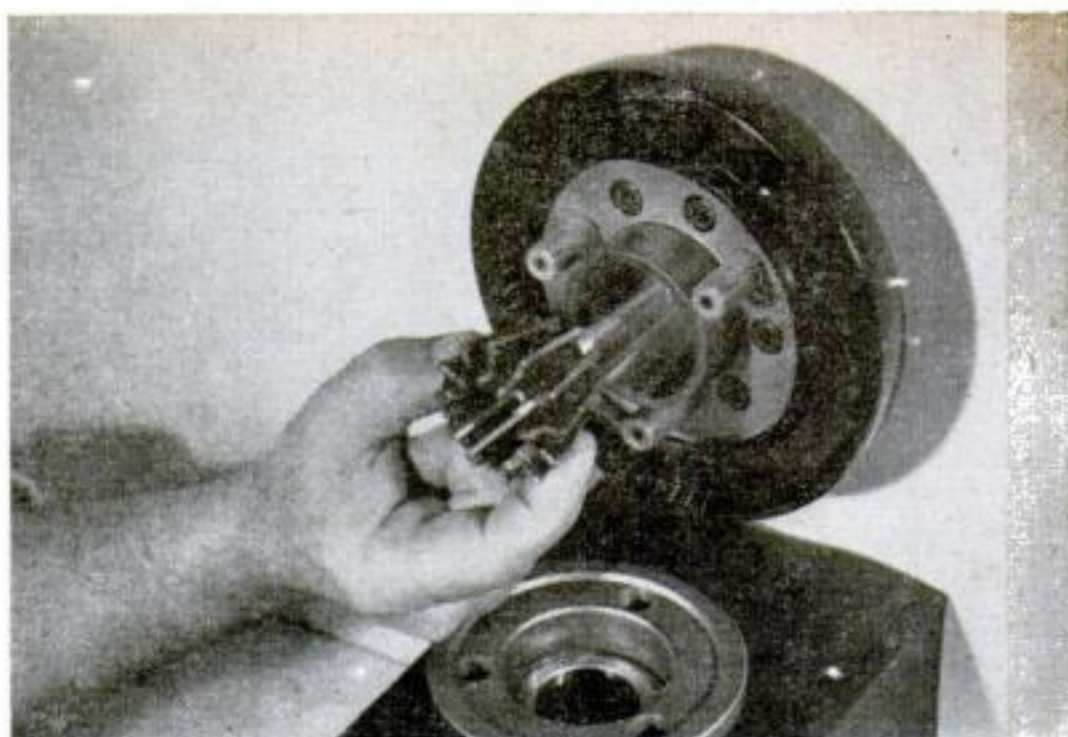
131



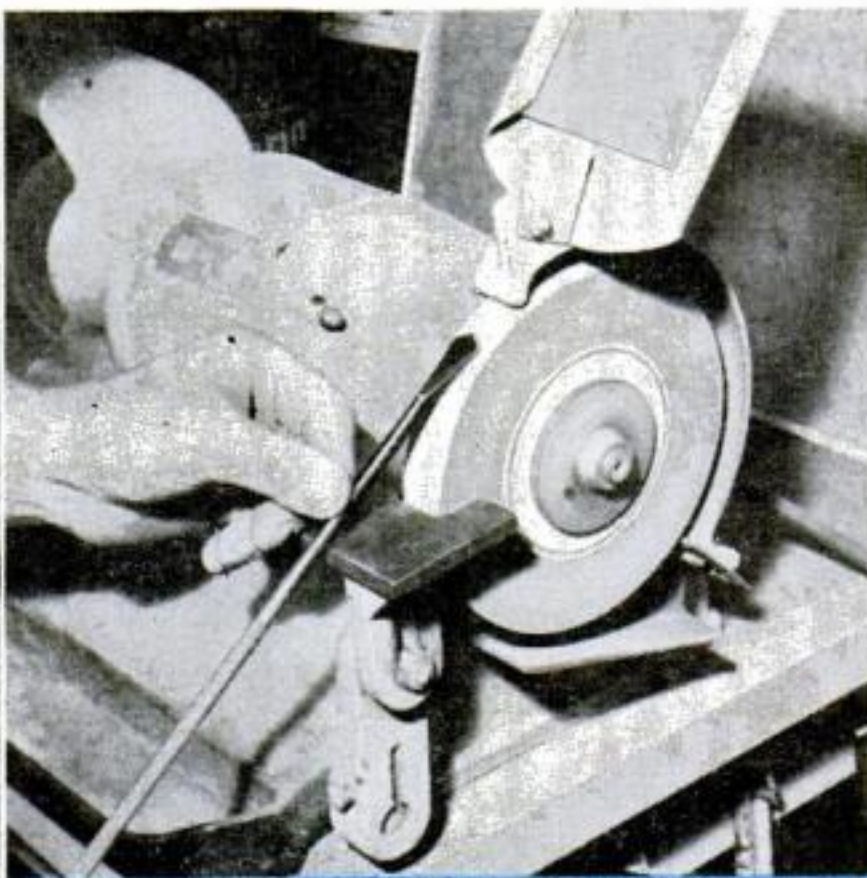
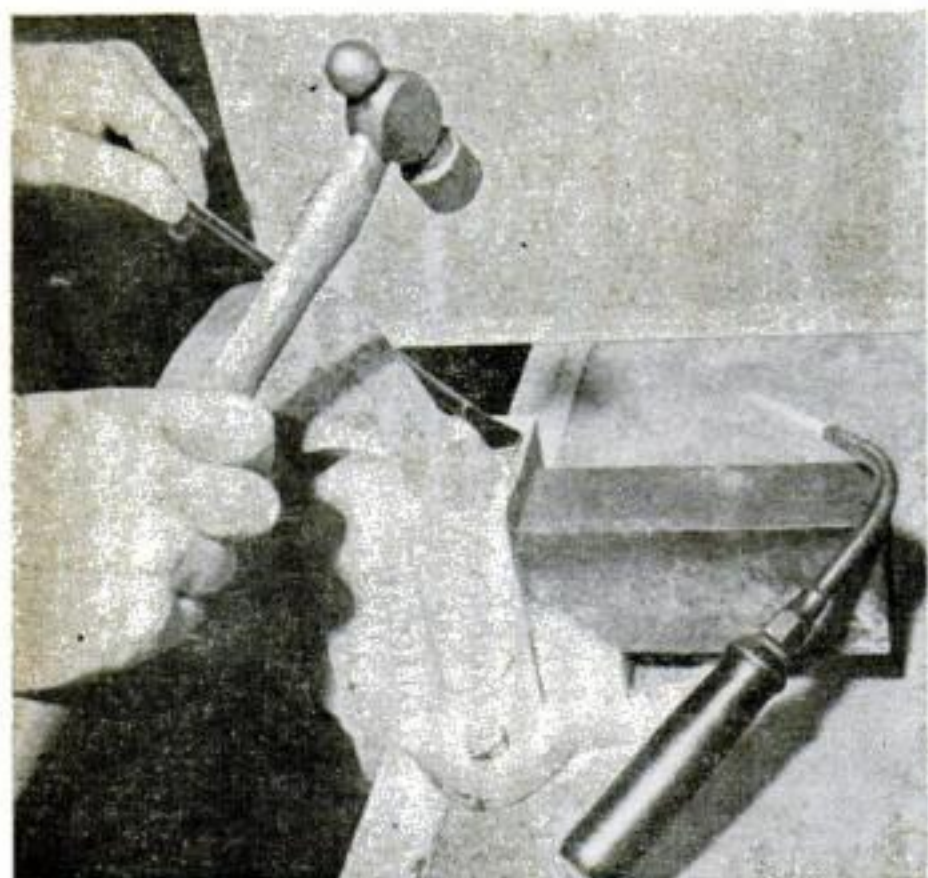
your lathe spindle, but you'd have to buy a drawbar and nosepiece, too, to use the steel collets, so you're still ahead.

The rubber collets have hardened and ground jaws molded into them. Because of their unusual flexibility, each collet size has a closing range of .100", as compared with only .005" range in steel collets. The jaws remain parallel as the collets are closed on the workpiece, providing maximum grip along their full length. They're tested for accuracy and have a maximum runout of only .001".

Because no drawbar is used, the full inside diameter of your lathe spindle can be utilized for long work. The collets are tightened by turning a handwheel on the chuck.—*Herbert R. Pfister.*



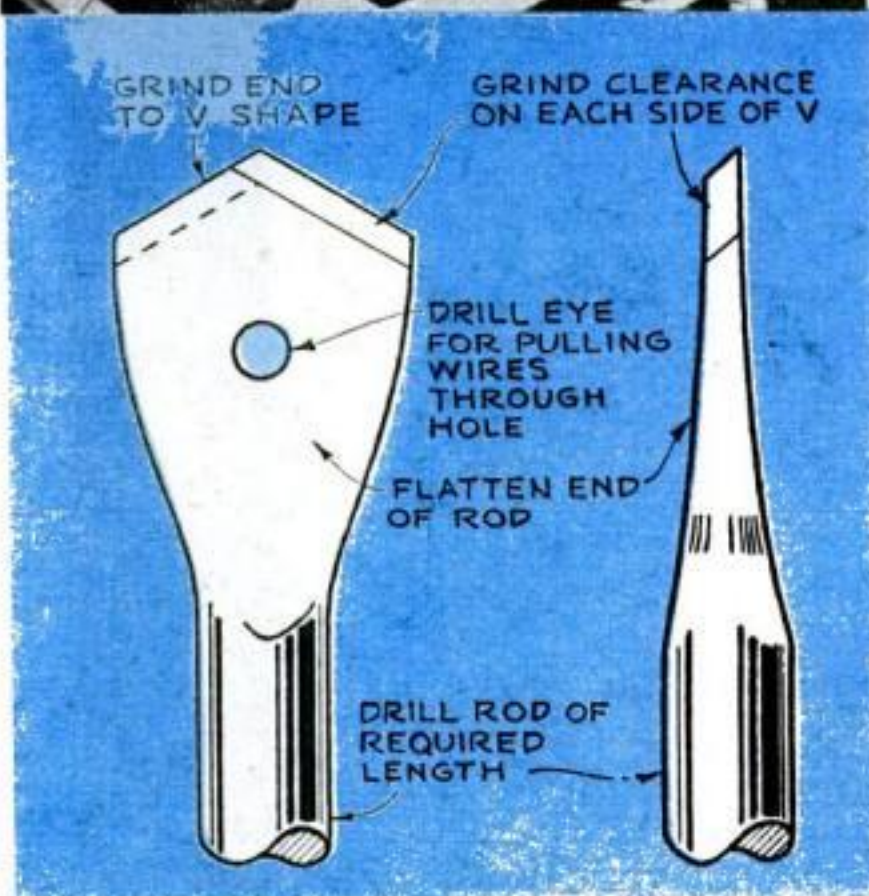
**TO MOUNT THE COLLETS** in the chuck, the nosepiece is removed and the proper collet inserted in a tapered hole in the chuck body.



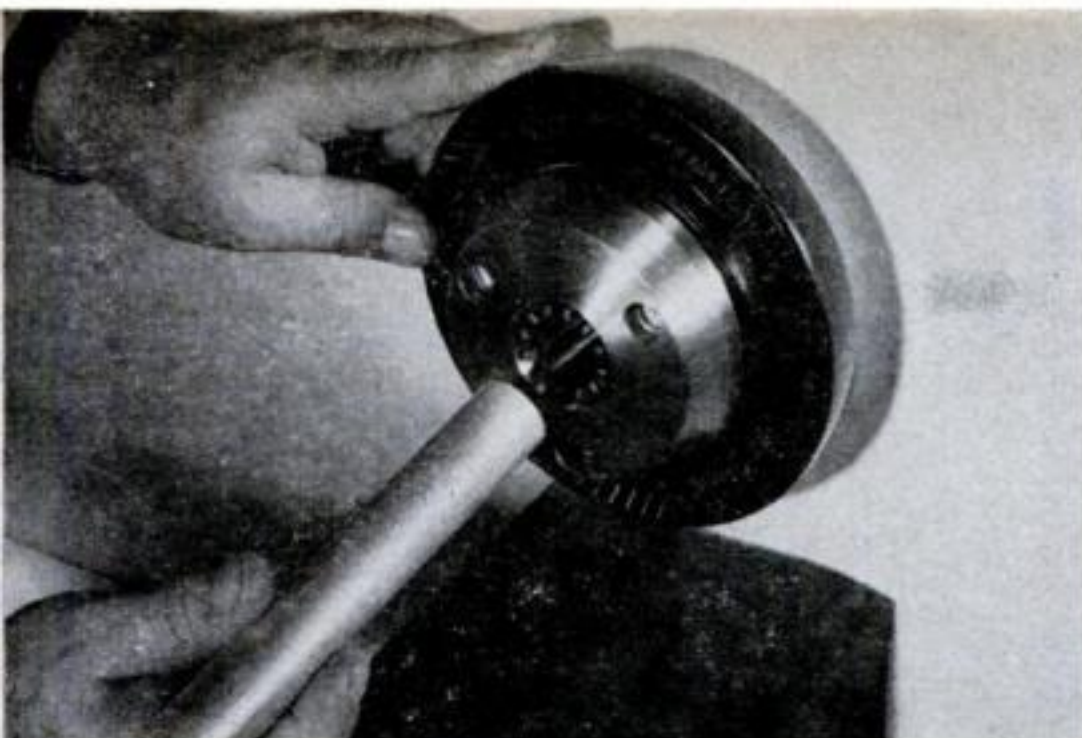
## Make Your Own Long Drills

**NEED** extra-long drills for special jobs? You can make them up to 3' in length from drill rod of various diameters. Heat one end red and hammer it flat on the anvil of your vise until it is about  $\frac{1}{32}$ " thick. Grind a V shape on the end, keeping the point of the V centered; then grind slight clearance on each cutting edge. If you plan to use the drill for house wiring, drill a hole near the point to make an eye for pulling wires through framing.

Heat the tip red and quench it in water to harden it. Polish it bright and slowly heat it to a straw or blue color, depending on the temper required.—*Gustav F. Hengel, Wayne, N. J.*







**NOSEPIECE** is brought into position by turning the handwheel clockwise. The work is inserted before the collet begins to compress.

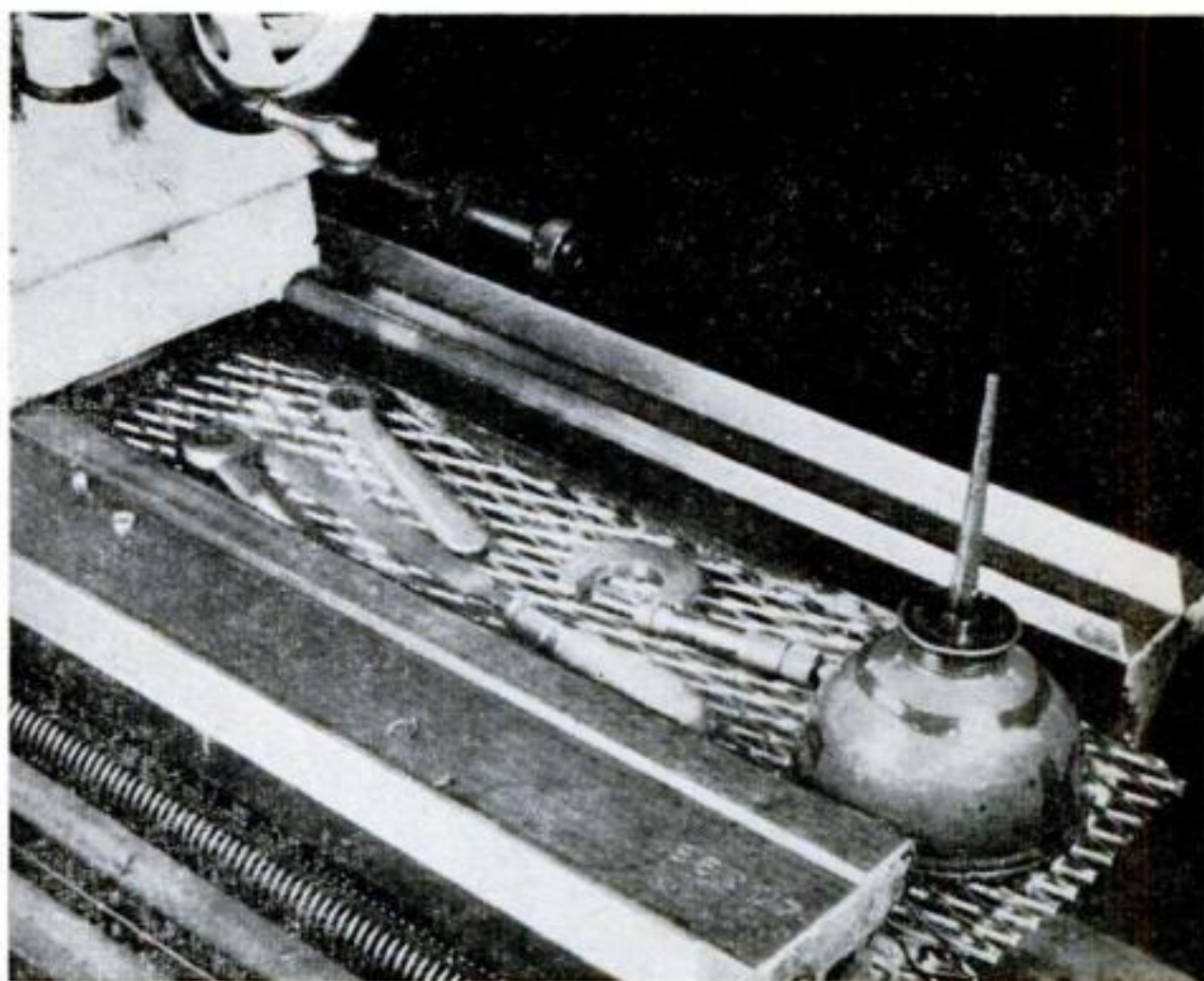


**FINAL TIGHTENING** is done with a hex wrench inserted in one of the three bolts with pinion gears. Turning any one tightens all three.

## Tool Tray Sheds Chips

YOUR lathe tools won't be buried under a drift of chips or flooded with oil if you keep them on a tray of expanded metal. Chips and oil will fall through the open mesh.

Cut a length of the metal mesh to fit between the bed ways and place it low enough to clear the hold-on block under the tailstock.—*H. J. Gerber, Stillwater, Okla.*



## How to Dress a Reamer

A REAMER will produce an exceptionally fine finish if you lap the cutting edges lightly with fine lapping compound.

Dog the reamer between centers in the lathe and run the machine in reverse while you hold an adjustable ring lap lightly around the flutes.

This method will remove only a few ten thousandths—not enough to impair the relief angle on the cutting edges—but it will clean away rust, metal build-up, and small nicks.—*H. J. Gerber, Stillwater, Okla.*



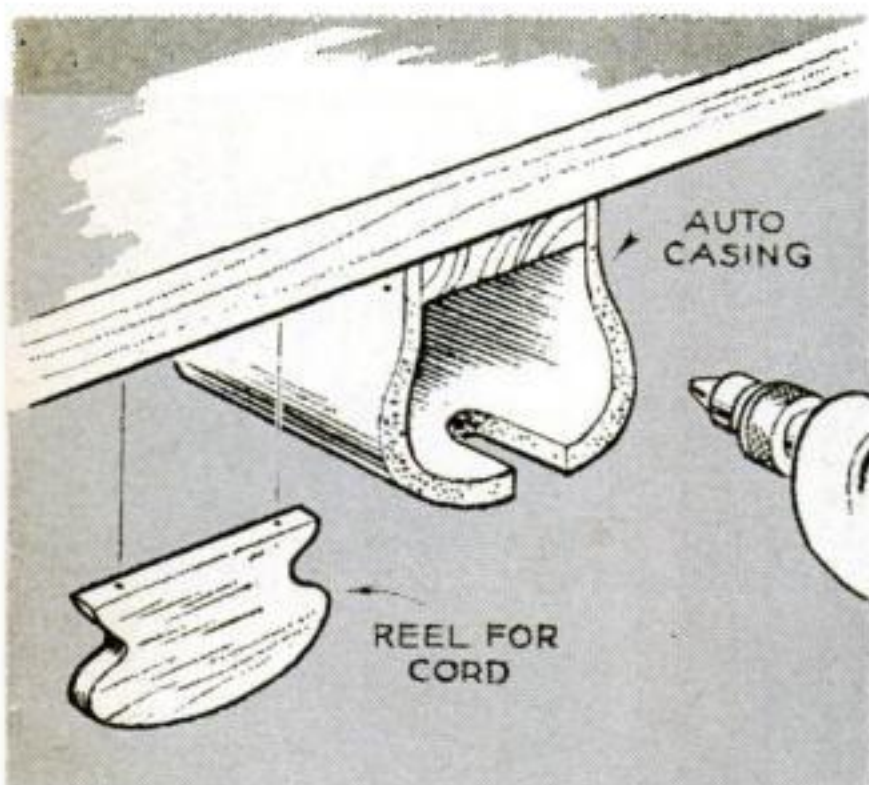
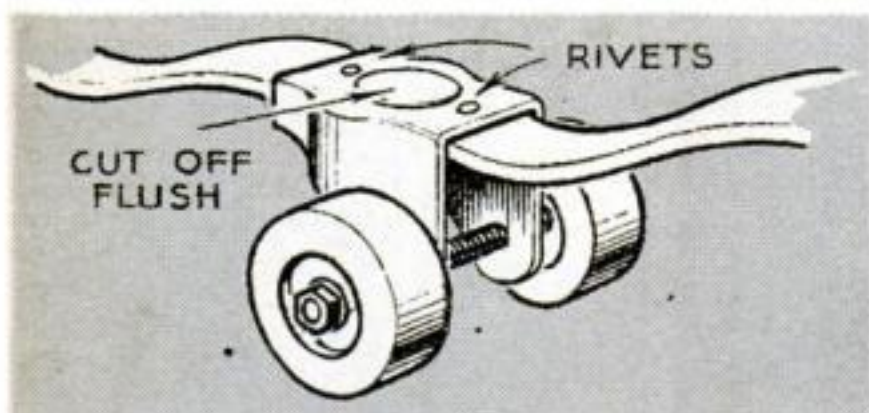


## Short Cuts and Tips

FROM PS READERS

### Luggage Skate from Casters

YOU won't be at the mercy of porters if you make a luggage skate. Remove the wheels from two furniture casters and hacksaw off the top section of one axle bracket. File it to provide a flat top plate. Buy a leather strap long enough to be belted around your suitcase and just wide enough to fit flat inside the bracket. Center the bracket on it and secure with rivets. Attach the two wheels as below with a 4" bolt, washers, and two nuts. —*Sheila Ostrander, Paris, France.*

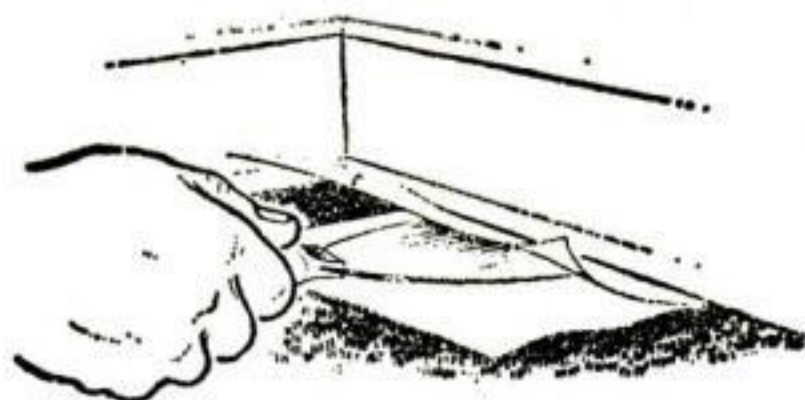


### Holster for Electric Drill

A SLING that keeps an electric drill within reach under a workbench can be made from a section of auto tire. Cut a slot to take the drill handle and remove the beads to form straight edges; tack these to opposite sides of a block and nail under the bench. A rack cut from  $\frac{3}{4}$ " plywood can be provided for the line cord. Shape the rack as shown above. —*G. E. Hendrickson, Argyle, Wis.*



▶▶▶ SMALL scratches through the silver coating on back of a mirror can be made nearly invisible if you apply a patch of aluminum foil to the back. Coat the shiny side with white shellac—not lacquer—and press it over the scratch, rolling with a furniture caster to secure an even bond. —*Ken Murray, Colon, Mich.*



### Protect Carpet from Paint

WALL-TO-WALL carpeting can be a problem when it comes to repainting the baseboards. My solution is to insert folded paper or aluminum foil along the edge, between molding and carpet, with a wide-blade scraper or putty knife. Once the paint is dry, I press the blade between the paper and the molding edge to break the paint seal, then pull the paper out. —*R. F. George, Riverdale, Md.*





You can ease  
family travel  
with a—

# Station Wagon Bunk Bed

By Henry V. Lukas

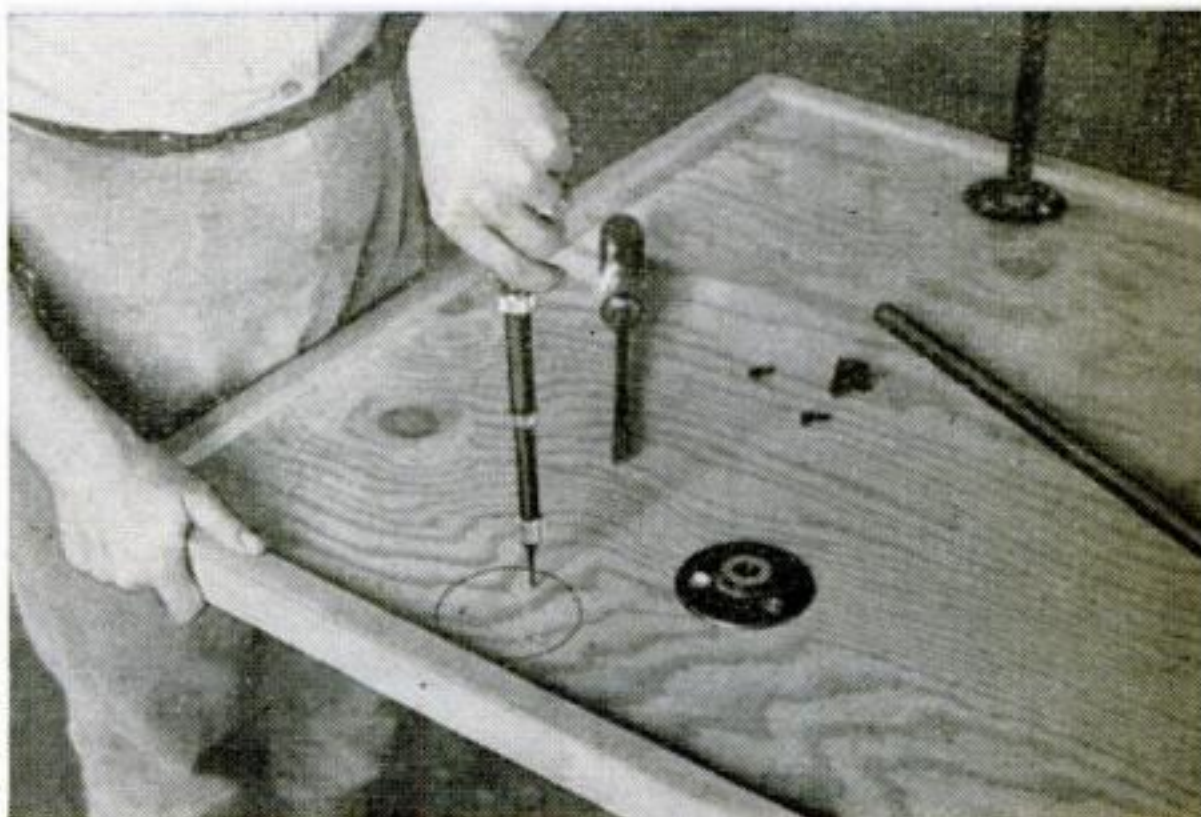
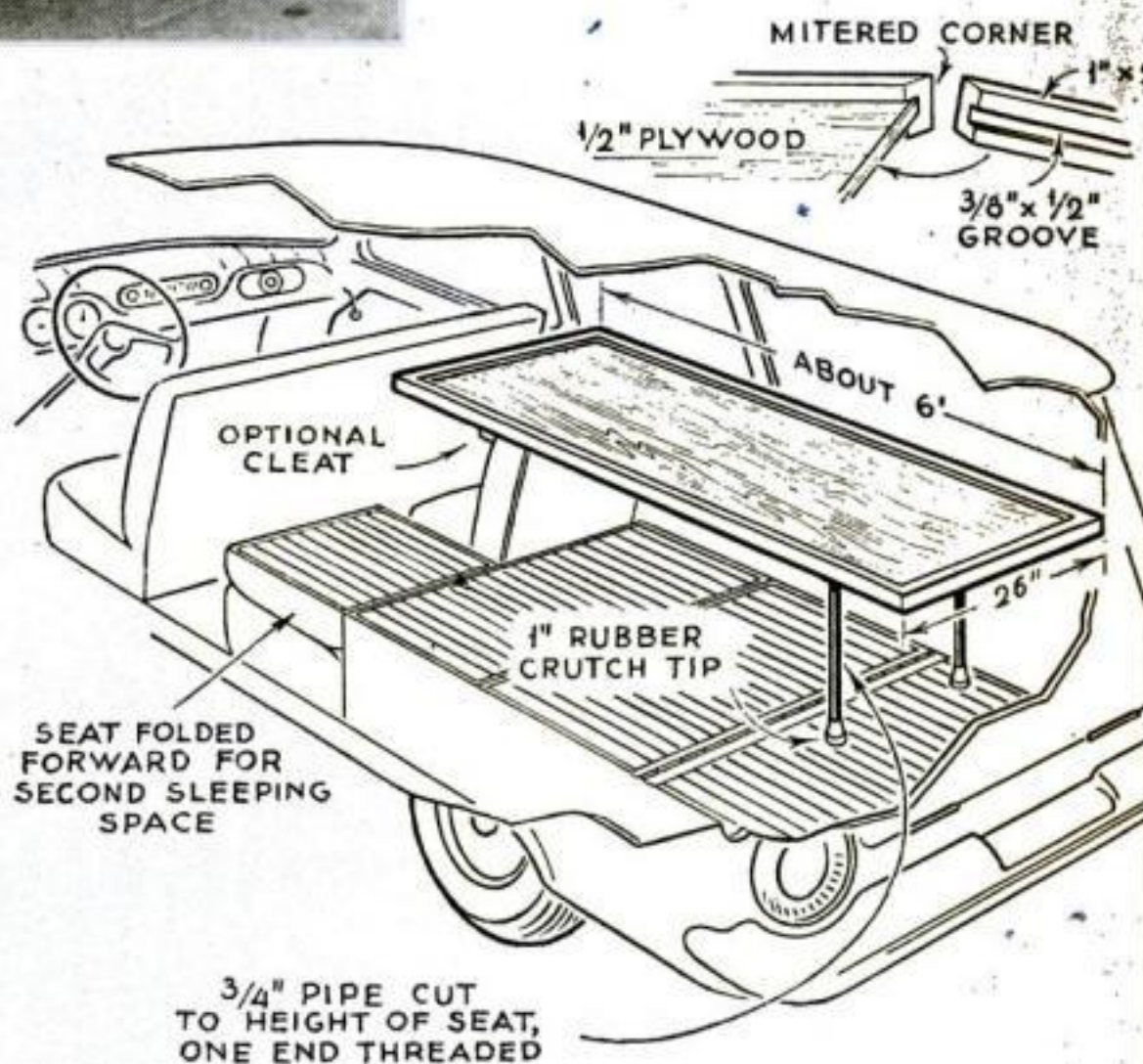
**M**Y PROBLEM was how to sleep two in my station wagon and have room for supplies and equipment, too. The solution took the form of a simple bunk bed that cost only a few dollars. It increases useful floor space by 50 percent.

I planned the bunk to rest on top of the second seat at the front end. Two pipe legs at the other end make the bed level. The bunk is just over 6' long and 26" wide. Most recent wagons will handle this size. The width leaves room on the floor alongside for a second sleeping bag.

Under the bunk you have a useful storage area. I've found it will handle almost everything we need on a camp-out.

I toyed awhile with the idea of making the bunk fold in half. But we find no need to take it down. It would be a simple matter to put a hinge in the middle, if you want foldability.

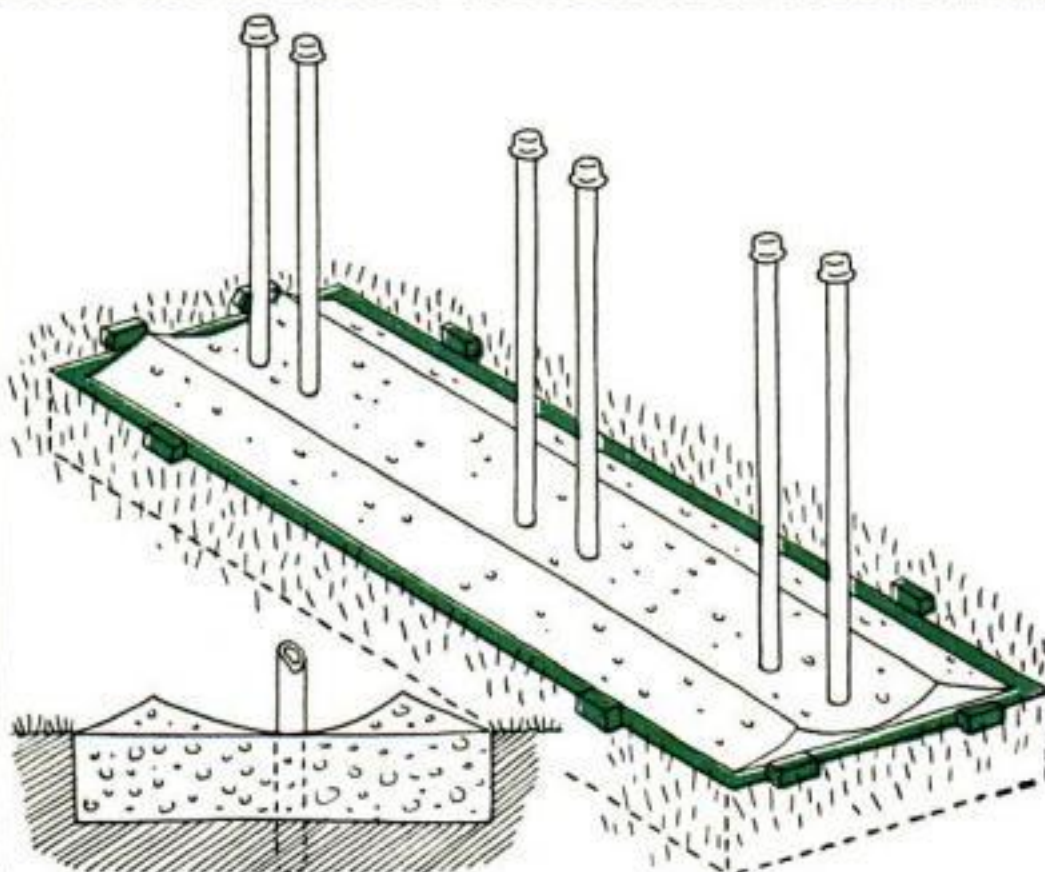
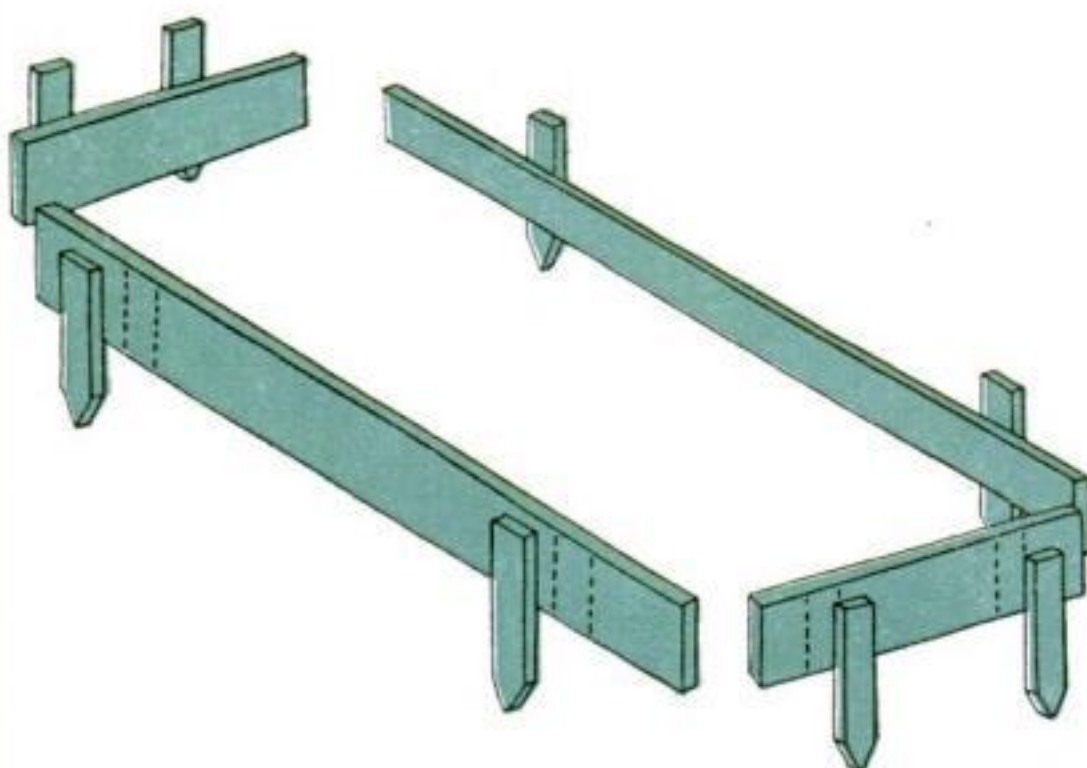
**TWO PIPE FLANGES** on the underside near one end hold the screw-in pipe legs. Bore pilot holes, as you see here, for the screws that will hold on the flanges.



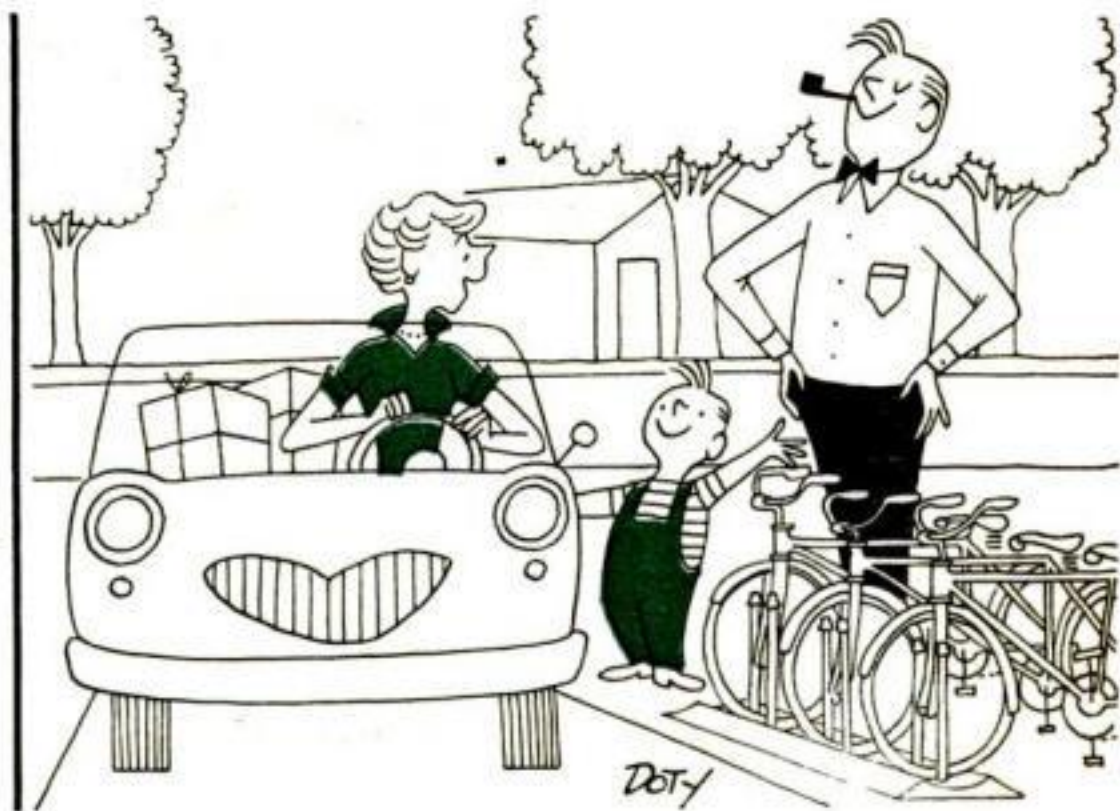
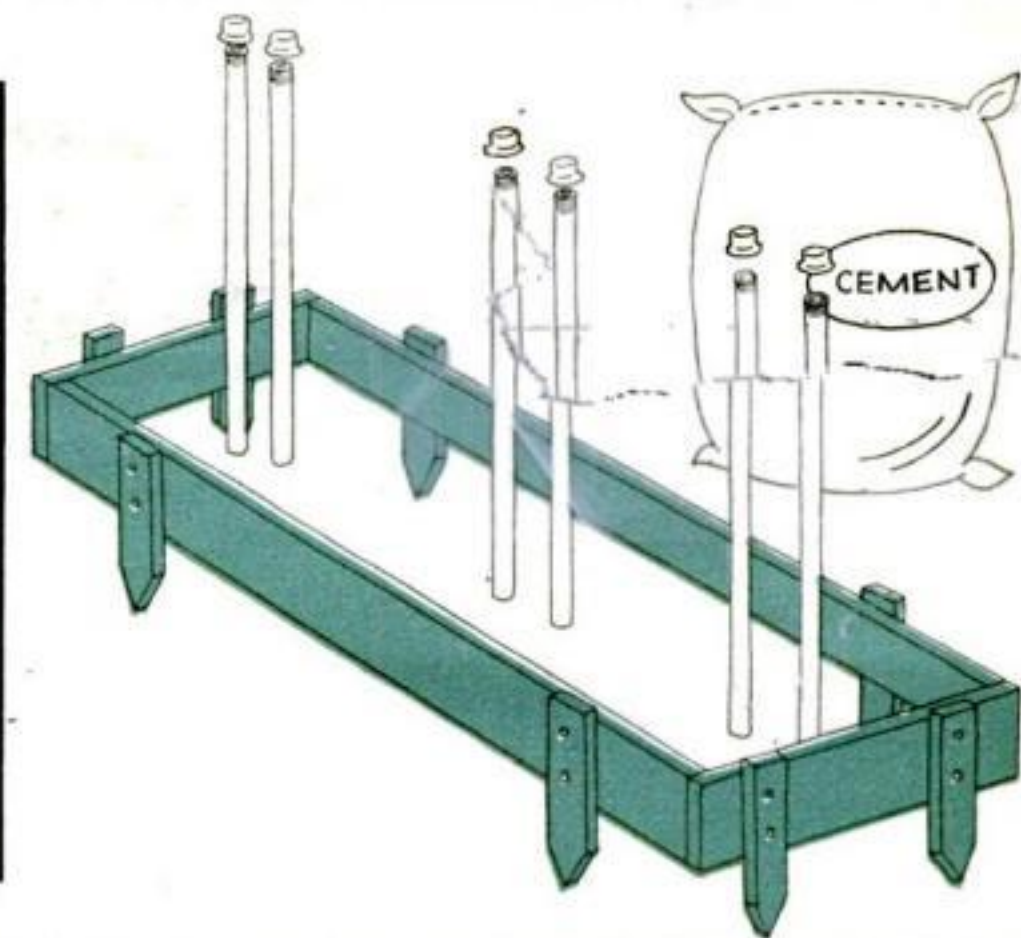


# Wordless Workshop

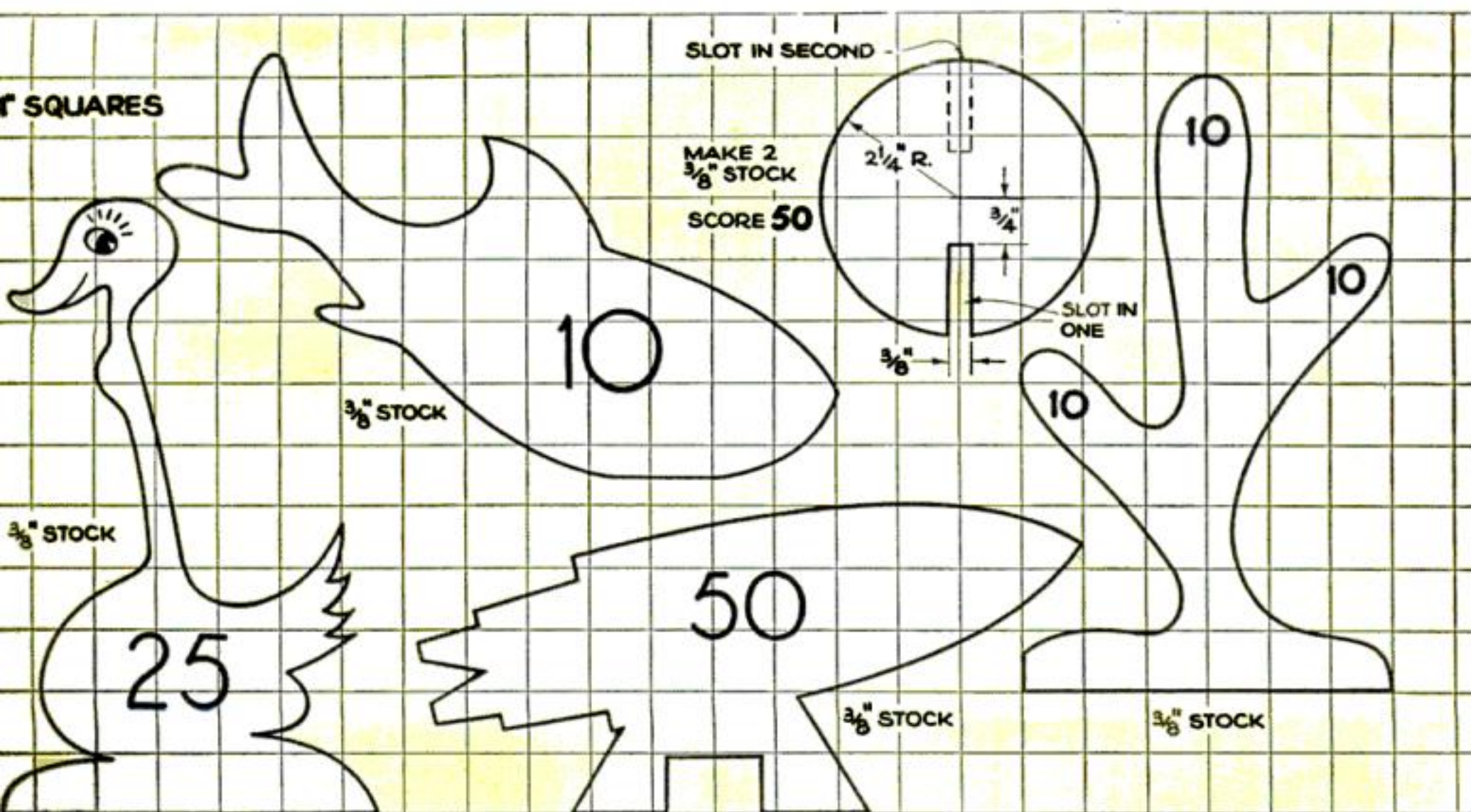
By Roy Doty  
and Jackson Hand













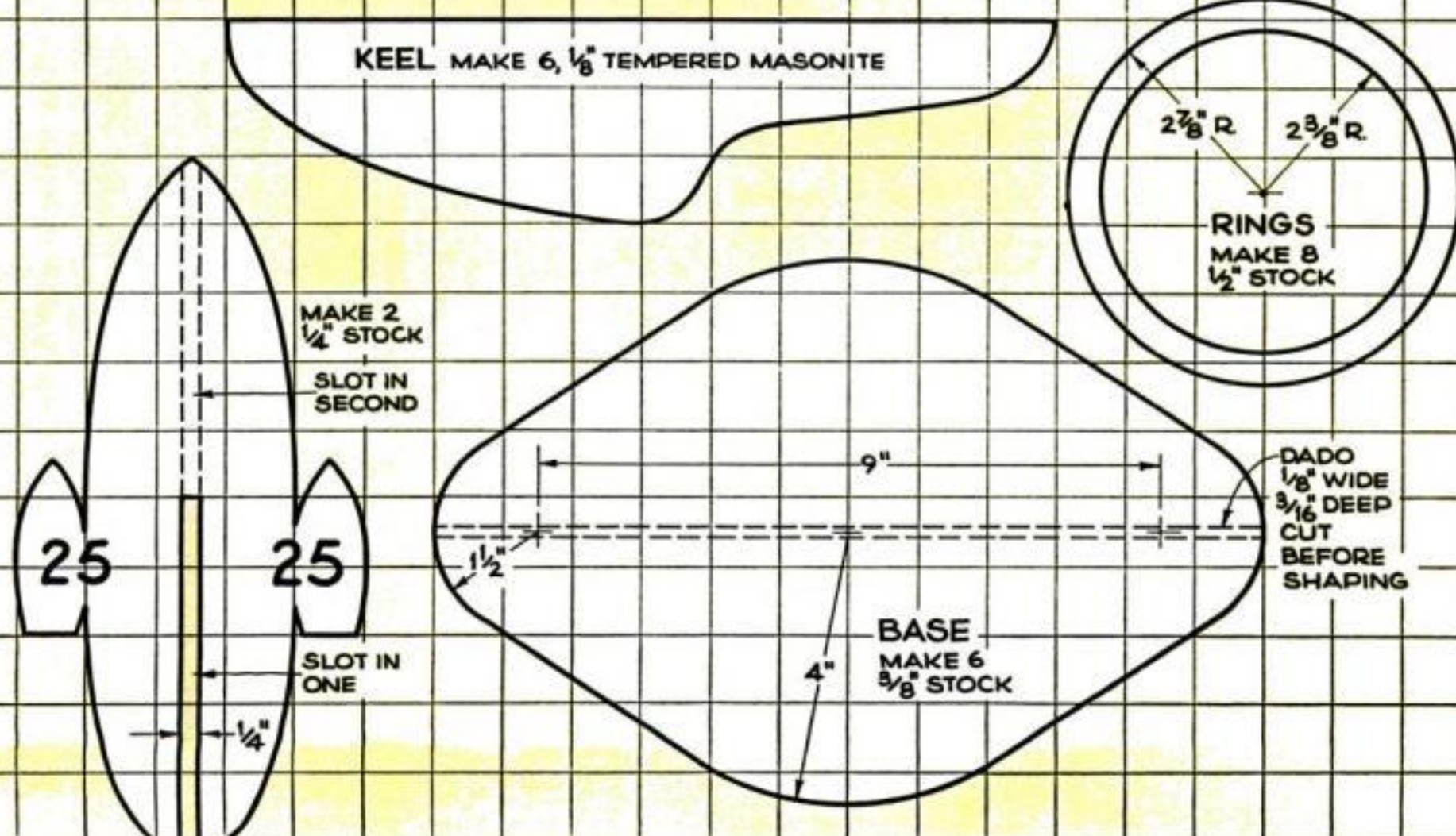
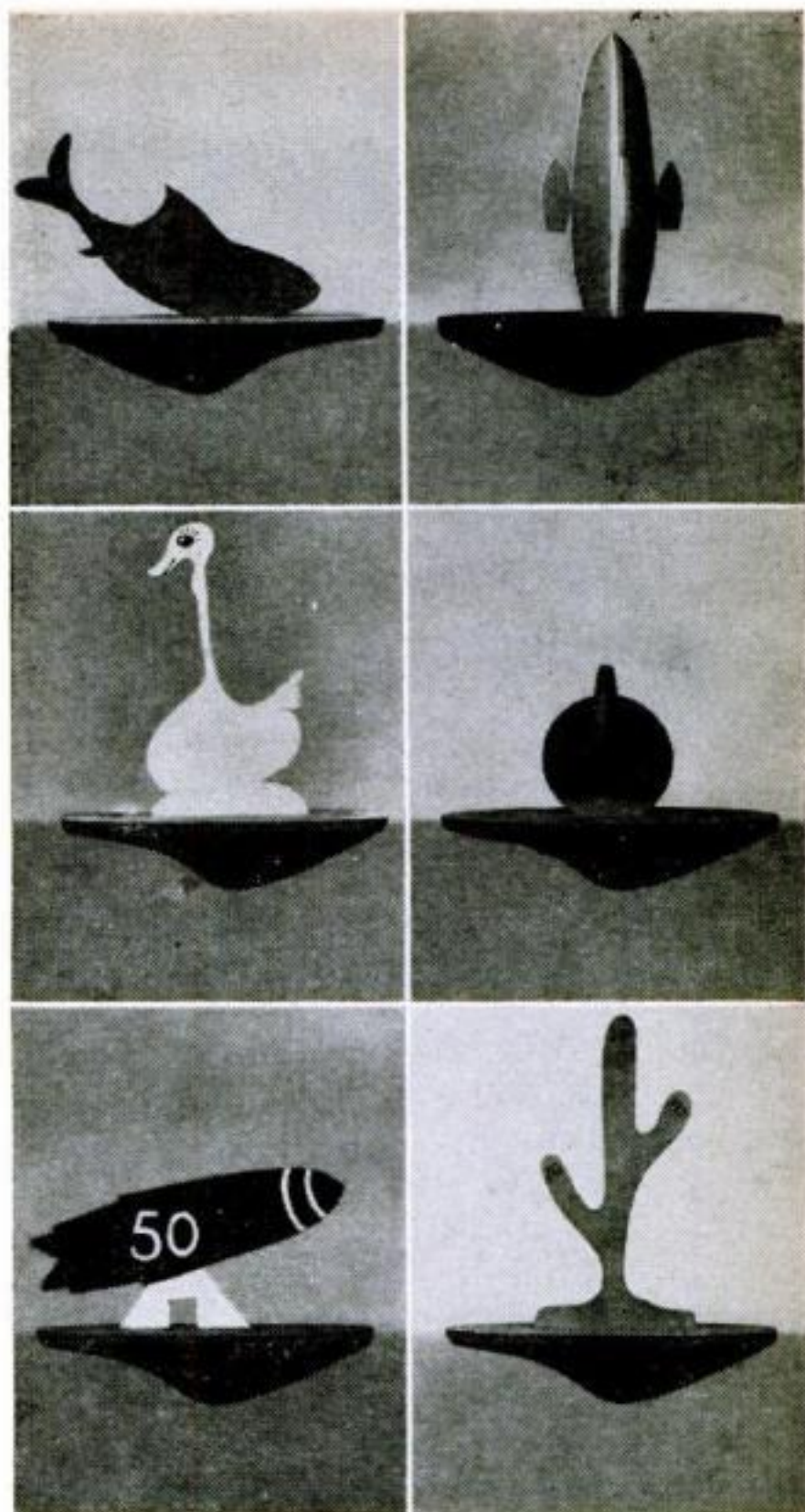
**How to jigsaw  
fancy targets for a—**

# Ring-Toss Water Game

**By R. J. DeCristoforo**

**O**NCE you've made this water version of the old ring-toss game, you'll have just the incentive you need to install that back-yard swimming pool. If you don't go for that, the game can be just as much fun on a lake or stream. Or you can even have a landlubber's version, simply by leaving off the keels.

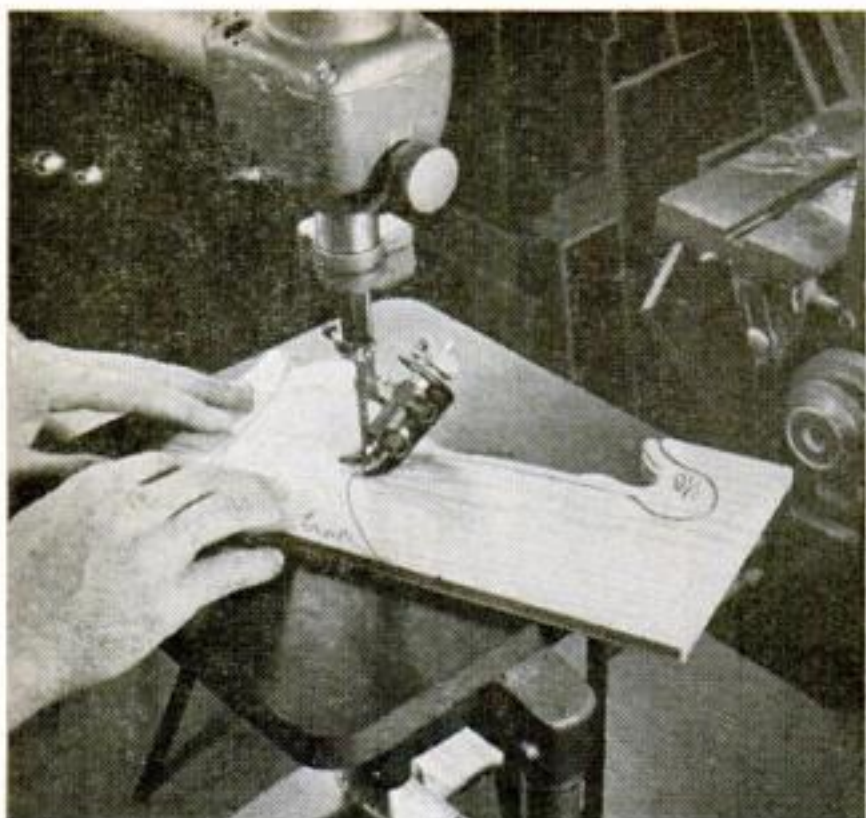
With a little practice you can develop an easy skill in ringing the targets at considerable distances. Light fishing line, attached to each ring through a small screw-eye, lets you pull in the target or retrieve the ring after a miss. To make the game tougher, rule that a score doesn't count unless the target is brought to the



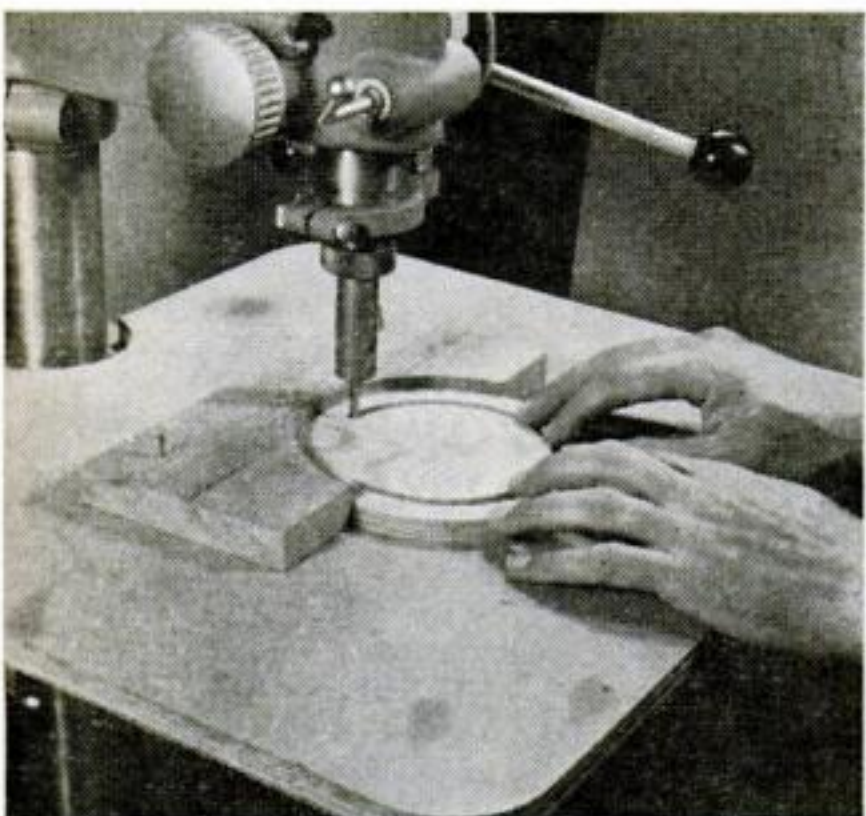
CONTINUED

139

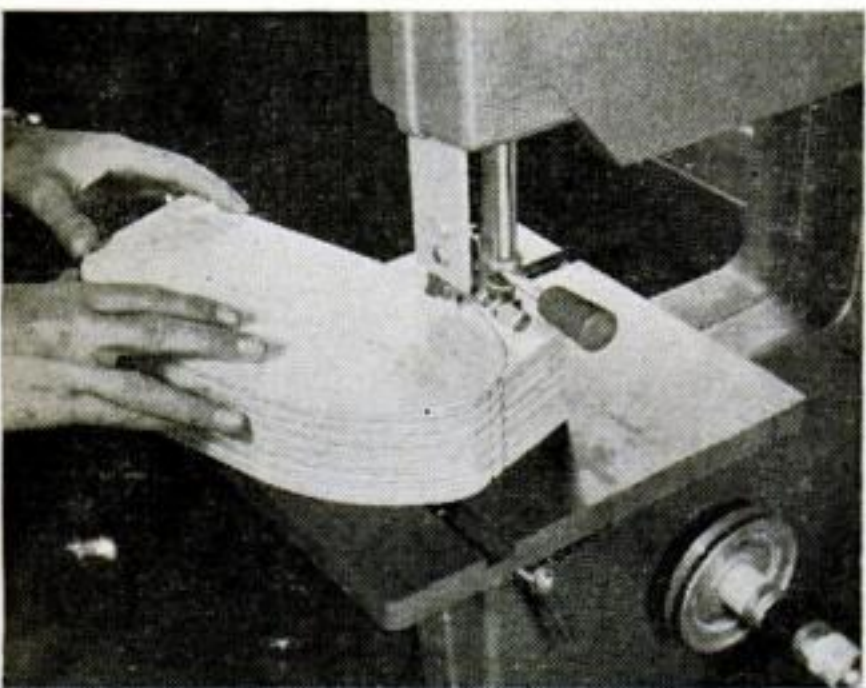




**DRAW TARGETS ON WOOD** or make paper patterns of them. Cut them out with a jigsaw or coping saw and sand all the edges smooth.



**CUT OUT INNER DISK** of rings with  $\frac{1}{4}$ " router bit at a speed of about 5,000 r.p.m. Cut half thickness on one pass and turn stock over.



**PAD-SAWING** precut blanks on a bandsaw is a fast way of cutting duplicate pieces. Bases for the game targets are being sawed above.

edge of the pool without tipping over.

**The winner** is the person or team that scores the greatest number of points after a fixed number of tosses. Or you can establish a definite score and the first to reach it wins. Each arm on the cactus is worth 10 points, so that target can score 10, 20, or 30 with one toss, depending on how many arms the ring encircles.

You may rule that the score you set must be hit right on the button, making careful target selection necessary. Ringing a target that puts you over the winning figure then halves any points you've accumulated. The player must always toss from the *side* of the pool, using the one farthest from the target chosen. If the target is more than half a pool length away and the player elects to toss from an *end* of the pool, he gets double the score marked on the target—if he rings it.

**Making the targets.** Use waterproof plywood (and tempered hardboard where shown). For the bases, keels, and rings, cut the stock to overall size and then stack for pad-sawing on a bandsaw. You can do this on a jigsaw, too, but the stack can't be as thick. Be sure to cut the dados for the keels before you shape the bases. Most regular saw blades will cut the  $\frac{1}{8}$ "-wide dado.

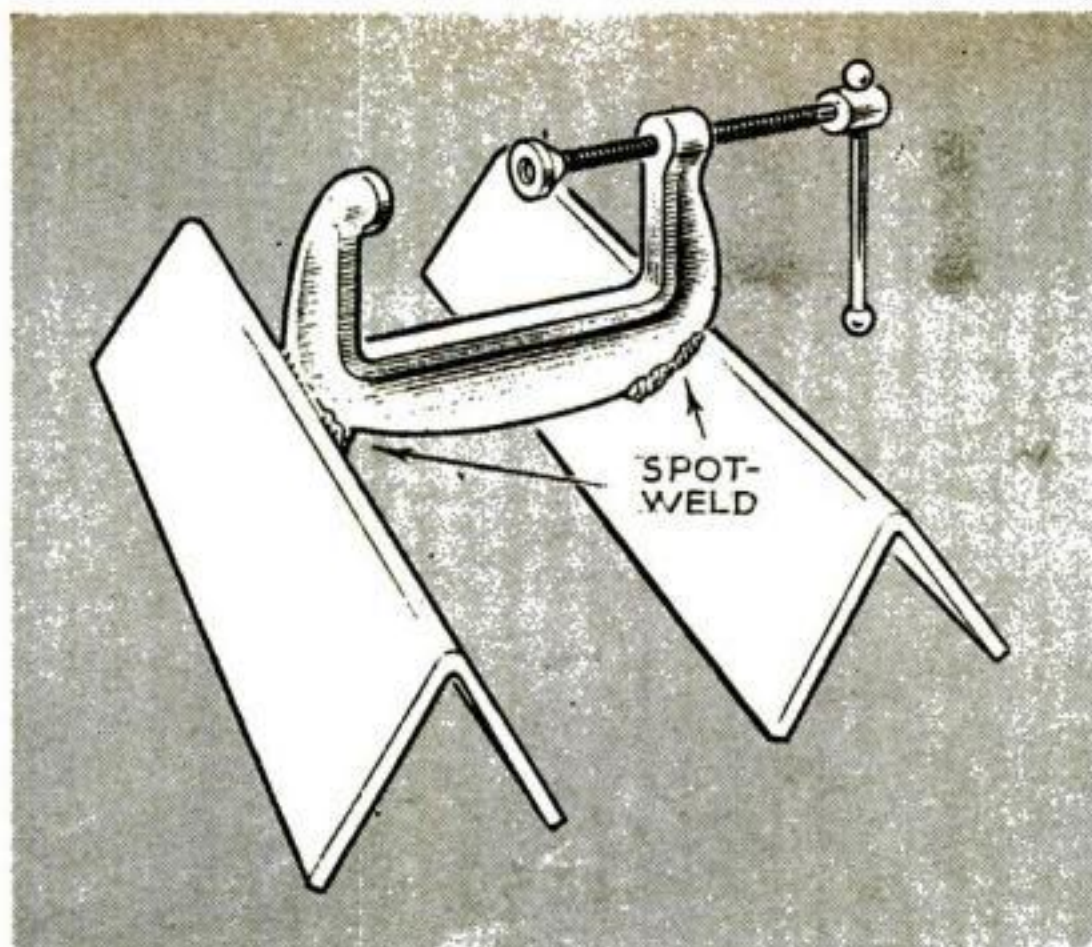
Attach the targets to the bases with waterproof glue and two finishing nails driven up through the dado in the base. Targets should be on center with the dado but the weight balance is not critical. Use waterproof glue to set the keels in place.

Use a plastic finisher as an undercoater for all parts, and lacquer.



**BRUSHING ON GAY LACQUERS** isn't difficult if you use a retarder to delay drying a bit. Quick-dry lacquers will do it in one sitting.



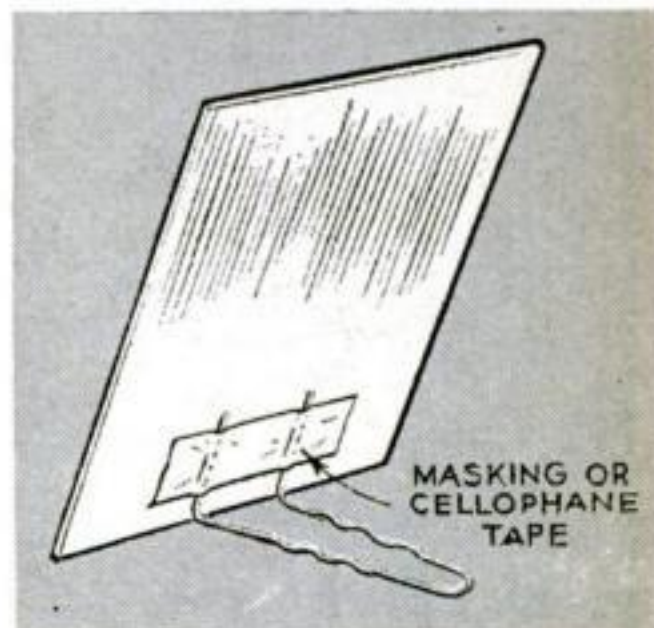


### Here's an Expendable Welding Vise

AN INEXPENSIVE C clamp and two pieces of 1" angle iron 8" long make a rugged vise for the welding table. The clamp is placed between the inverted angles so that the best contact for welding is provided. When the vise is burned up, as it finally will be, it can be replaced with another at nominal cost.—*M. R. Walker Jr., Danville, Ill.*

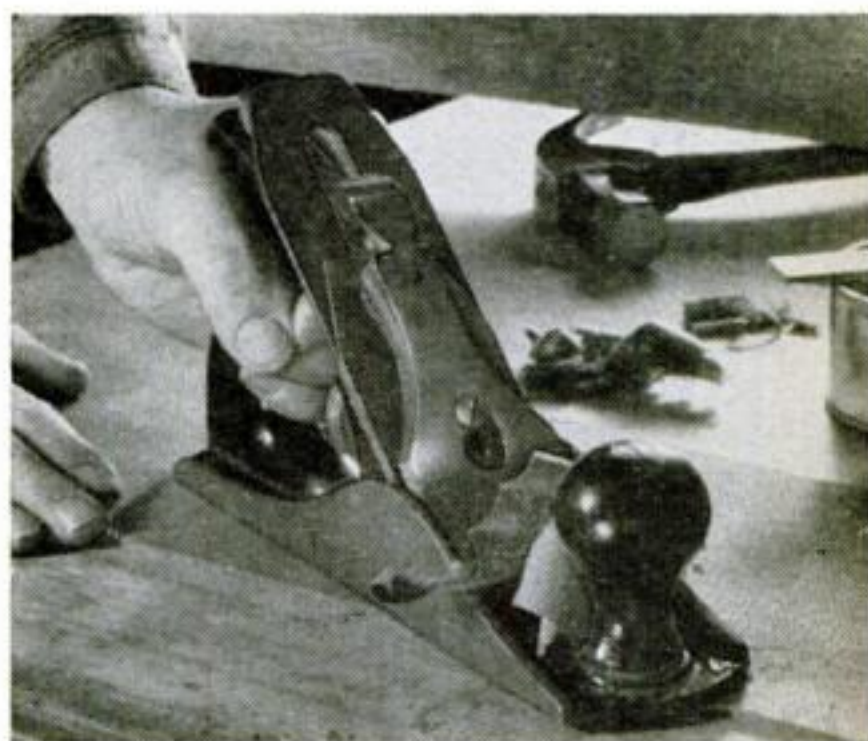
## Short Cuts and Tips

FROM PS READERS



### Hairpin Photo Stand

INSTEAD of propping a small, unframed photograph or snapshot against some knickknack, make it free-standing by taping the ends of a bent hairpin to the back.—*G. E. Hendrickson, Argyle, Wis.*



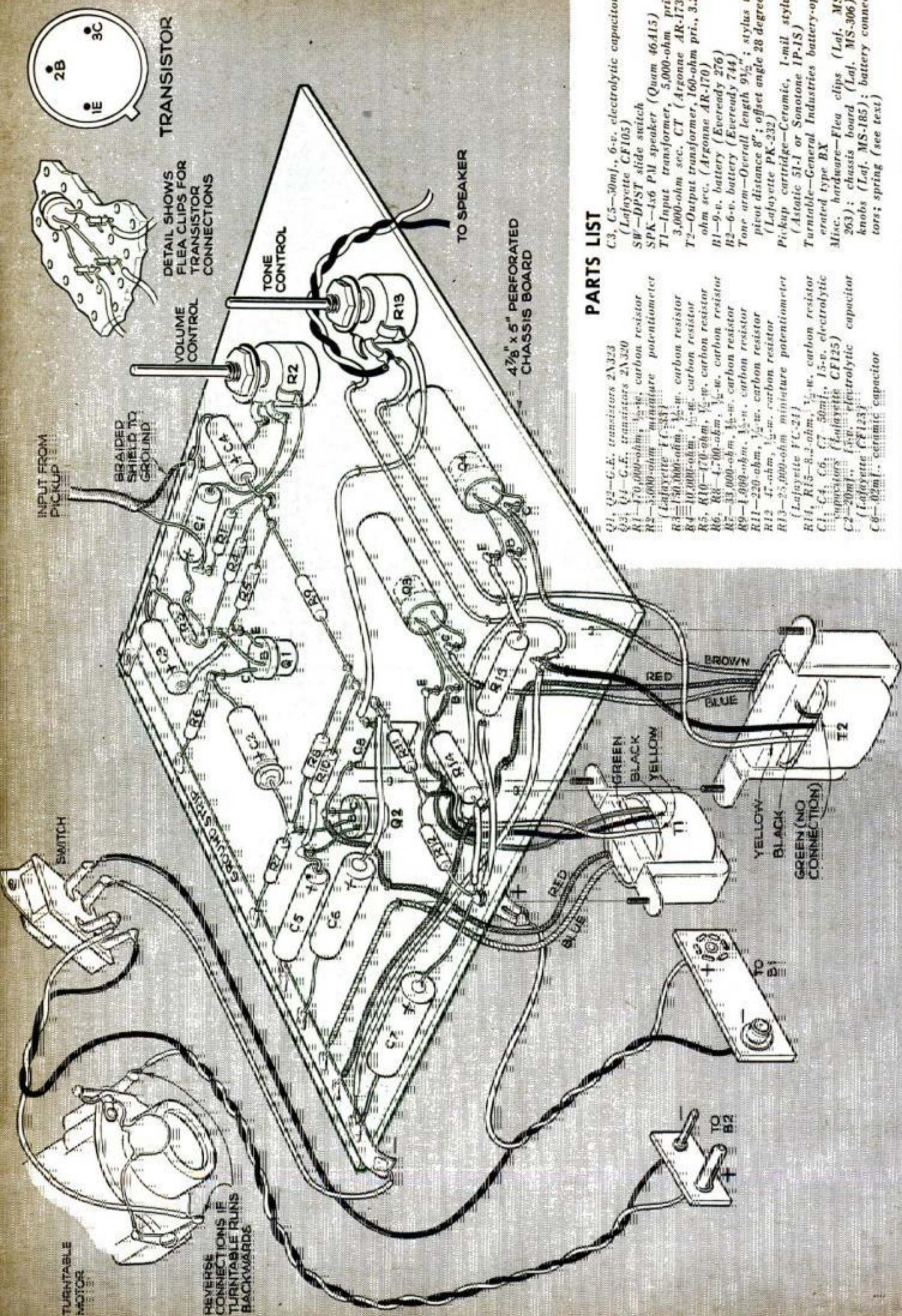
### Plane Hardboard for Gluing

WHEN you are gluing single-faced hardboard to a wooden frame, planing the "screen" side smooth will give a better glue bond.—*Jackson Hand, Westport, Conn.*

### Oil-Drum Tool Stand

AN EMPTY 55-gallon oil drum partly filled with sand or gravel will serve as a sturdy base for a drill press or other power tool that requires a stand.—*Wilber H. Fulker, Colorado Springs, Colo.*





# PARTS LIST

- Q1, Q2—G.E. transistors 2N323  
Q3, Q4—G.E. transistors 2N320  
R1—170,000-ohm, 1/2-w, carbon resistor  
R2—3,000-ohm miniature potentiometer (Lafayette FC-232)  
R3—150,000-ohm, 1/2-w, carbon resistor  
R4—10,000-ohm, 1/2-w, carbon resistor  
R5, R10—170-ohm, 1/2-w, carbon resistor  
R6, R8—4,700-ohm, 1/2-w, carbon resistor  
R7—33,000-ohm, 1/2-w, carbon resistor  
R9—1,000-ohm, 1/2-w, carbon resistor  
R11—220-ohm, 1/2-w, carbon resistor  
R12—47-ohm, 1/2-w, carbon resistor  
R13—25,000-ohm miniature potentiometer (Lafayette FC-21)  
R14, R15—8.2-ohm, 1/2-w, carbon resistor  
C1, C4, C6, C7—50mf, 15-v, electrolytic capacitors (Lafayette CF125)  
C2—20mf, 15-v, electrolytic capacitor (Lafayette CF123)  
C3, C5—50mf, 6-v, electrolytic capacitors (Lafayette CF103)  
SW—DPST slide switch  
SPK—4x6 PM speaker (Quam 46A15)  
T1—Input transformer, 5,000-ohm pri., 3,000-ohm sec. CT (Argonne AR-173)  
T2—Output transformer, 160-ohm pri., 3.2-ohm sec. (Argonne AR-170)  
B1—9-v. battery (Eveready 276)  
B2—6-v. battery (Eveready 744)  
Tone arm—Overall length 9 1/2"; stylus to pivot distance 8"; offset angle 28 degrees (Lafayette PK-232)  
Pickup cartridge—Cetamic, 1-mil stylus (Astatic 51-1 or Sonotone 1P-1S)  
Turntable—General Industries battery-operated type BX  
Misc. hardware—Flea clips (Laf. MS-263); chassis board (Laf. MS-306); knobs (Laf. MS-185); battery connectors; spring (see text)



# Portable Phono Plays Upside Down

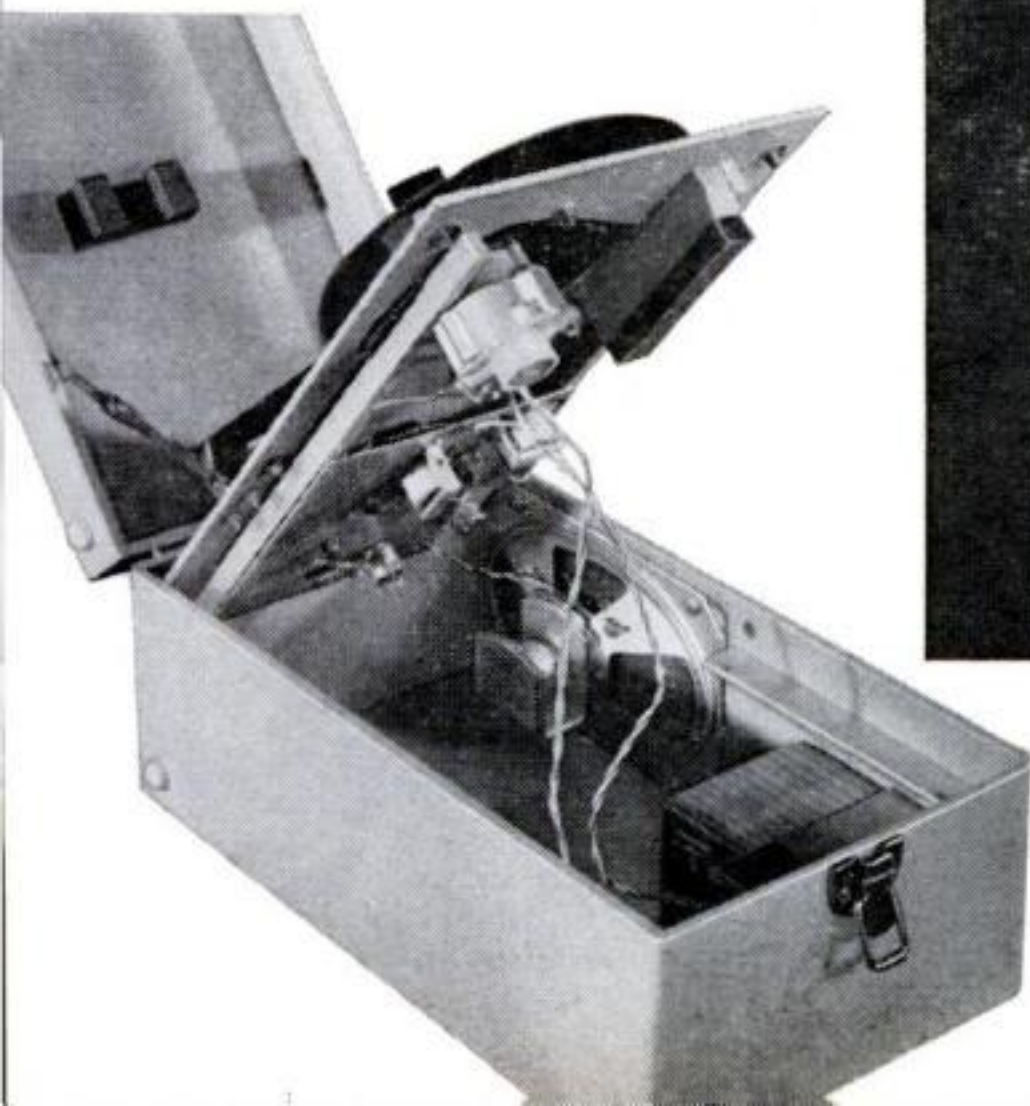
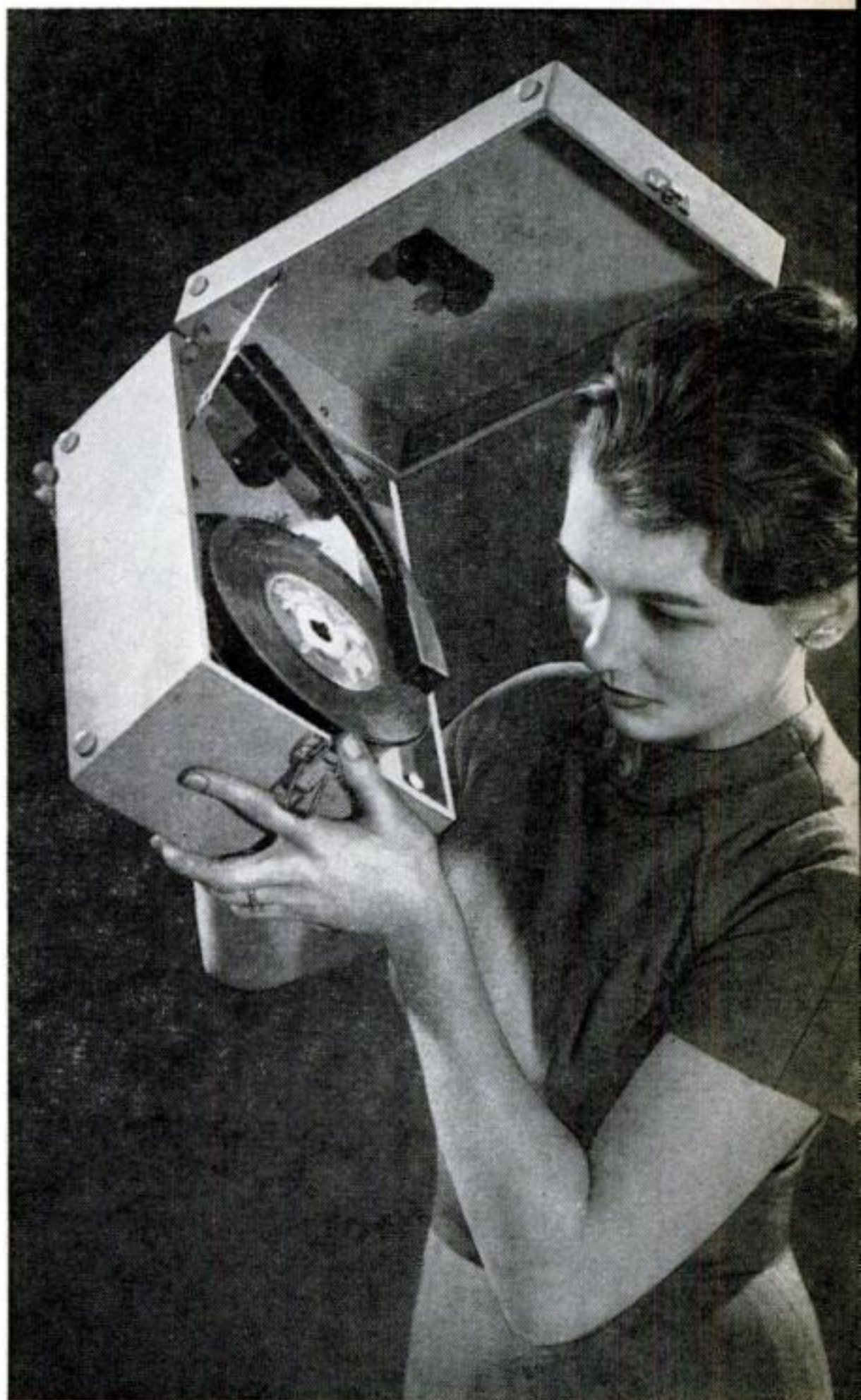
*Tipped, tilted, or level—it plays any way, anywhere.  
You can't buy it yet, but you can build it from PS plans*

**By Howard McEntee**

**Y**OU can have music wherever you go—and of your own choosing. This truly portable phono plays anywhere: in a car, on a boat, at the beach—even flying upside down in an airplane if that's your whim. A tricky tone-arm arrangement keeps the needle in the groove even when the machine is tipped at ridiculous angles.

There's ample volume for easy listening even in noisy locations. Although the sound is not high-fidelity, it's pleasant—cleaner than many AC portables labeled hi-fi. Total operating cost is between a cent and a half and two cents an hour. You can build it in two or three weekends and it won't cost any more than many ordinary portables that must plug into AC.

The case is homemade of tempered hardboard. The turntable



**RECORD IS STILL PLAYING** even with phono tilted like this. Photo at left shows "works" inside case. Motor board is hinged—lifts up for easy battery replacement. Amplifier chassis is screwed to wooden motor-board stiffeners. Turntable motor (near corner) runs on six volts. Built-in governor regulates turntable speed.

CONTINUED

143



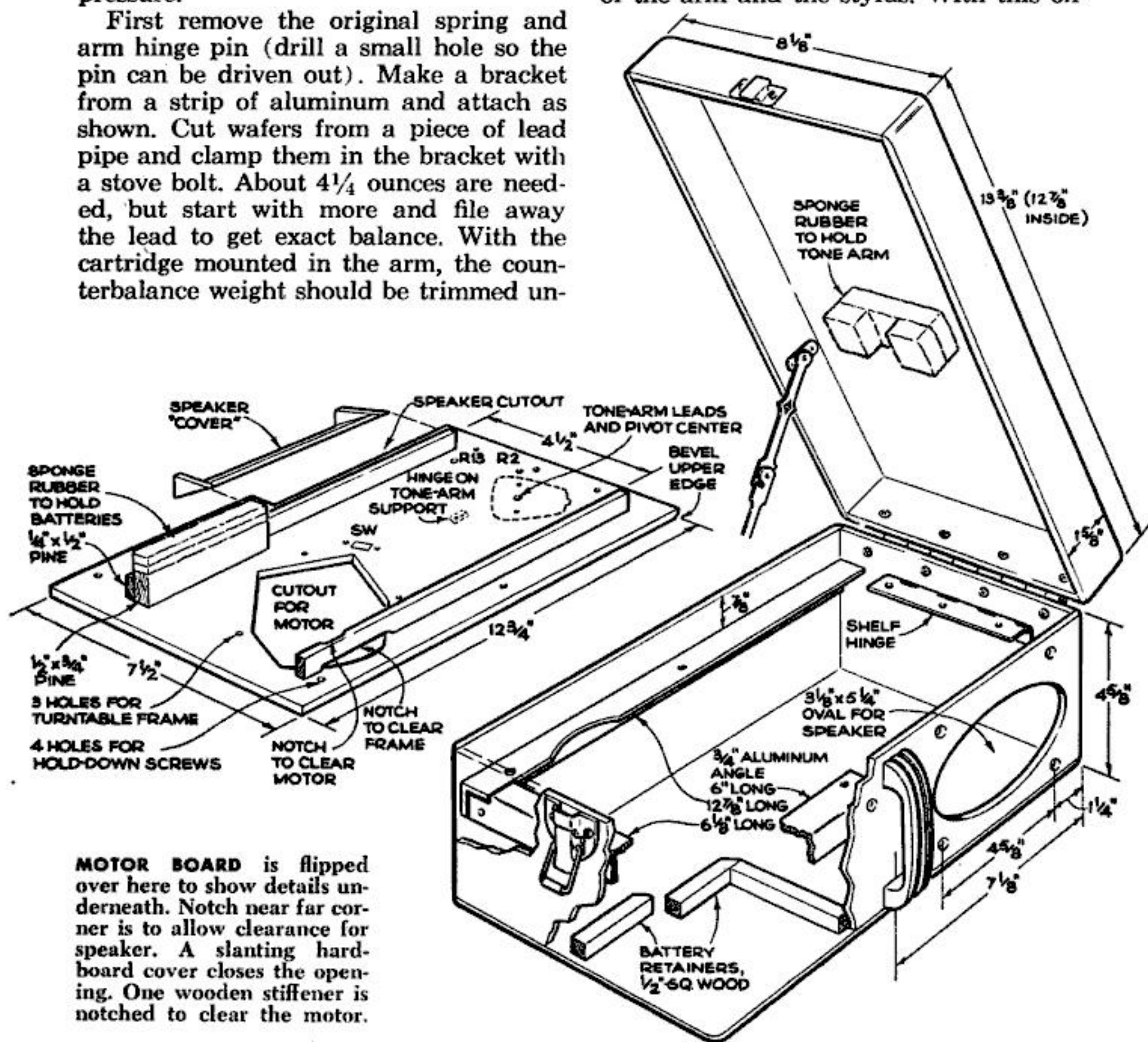
and dry-cell-powered motor are purchased as a ready-made unit. The tone arm is an inexpensive type that you modify according to instructions. You build the transistor amplifier.

**The tone arm.** The conventional tone arm depends on weight to hold the needle on the record. Part of this weight is counterbalanced by a spring, reducing needle pressure to an acceptable amount. Switching the role of the spring is the secret of the surprisingly well-mannered behavior of the modified arm. The arm is balanced precisely until there is no force downward on the needle due to gravity. Then a light spring is arranged to pull the needle *down* with just the right pressure.

First remove the original spring and arm hinge pin (drill a small hole so the pin can be driven out). Make a bracket from a strip of aluminum and attach as shown. Cut wafers from a piece of lead pipe and clamp them in the bracket with a stove bolt. About 4 1/4 ounces are needed, but start with more and file away the lead to get exact balance. With the cartridge mounted in the arm, the counterbalance weight should be trimmed un-

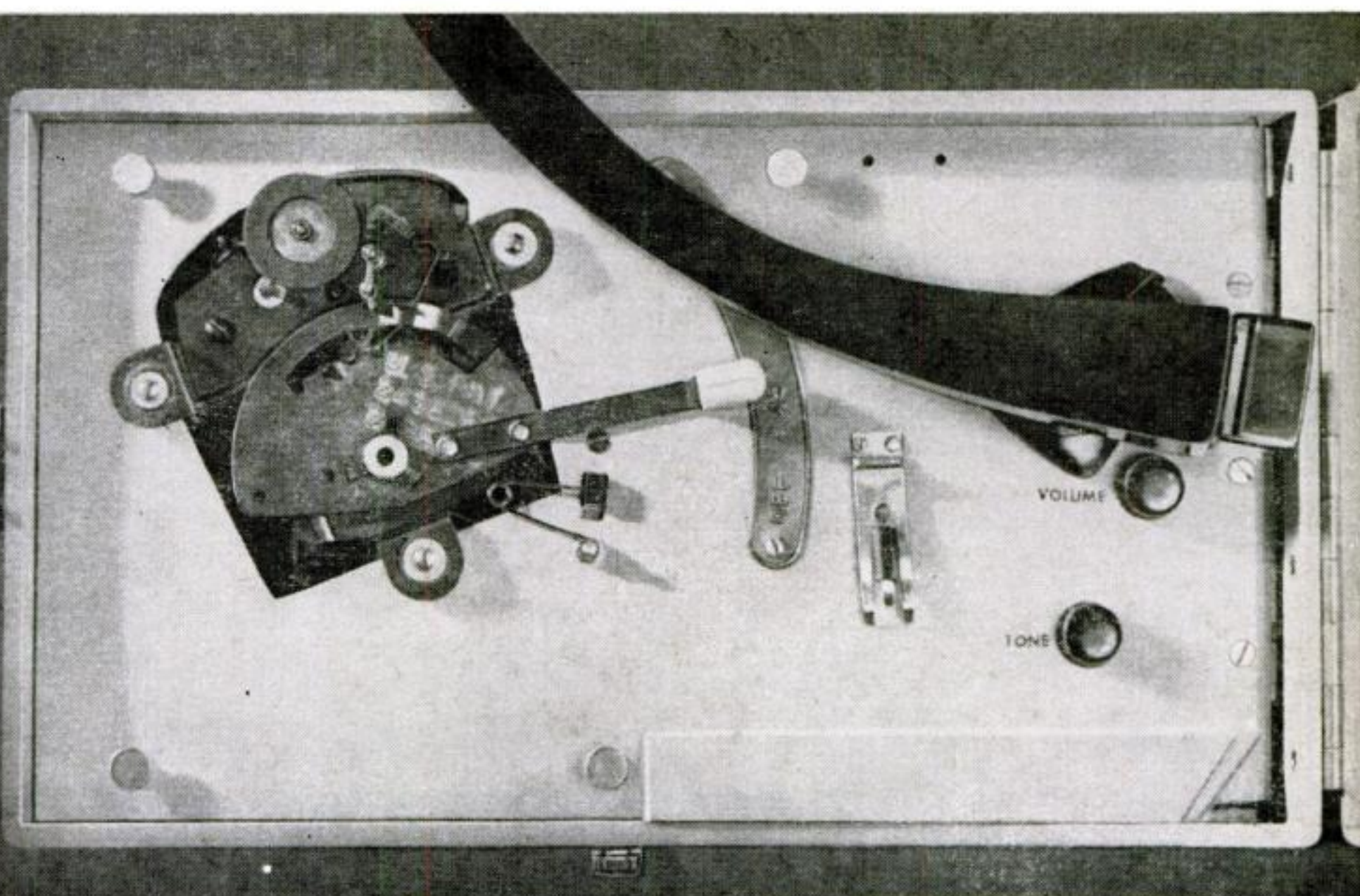
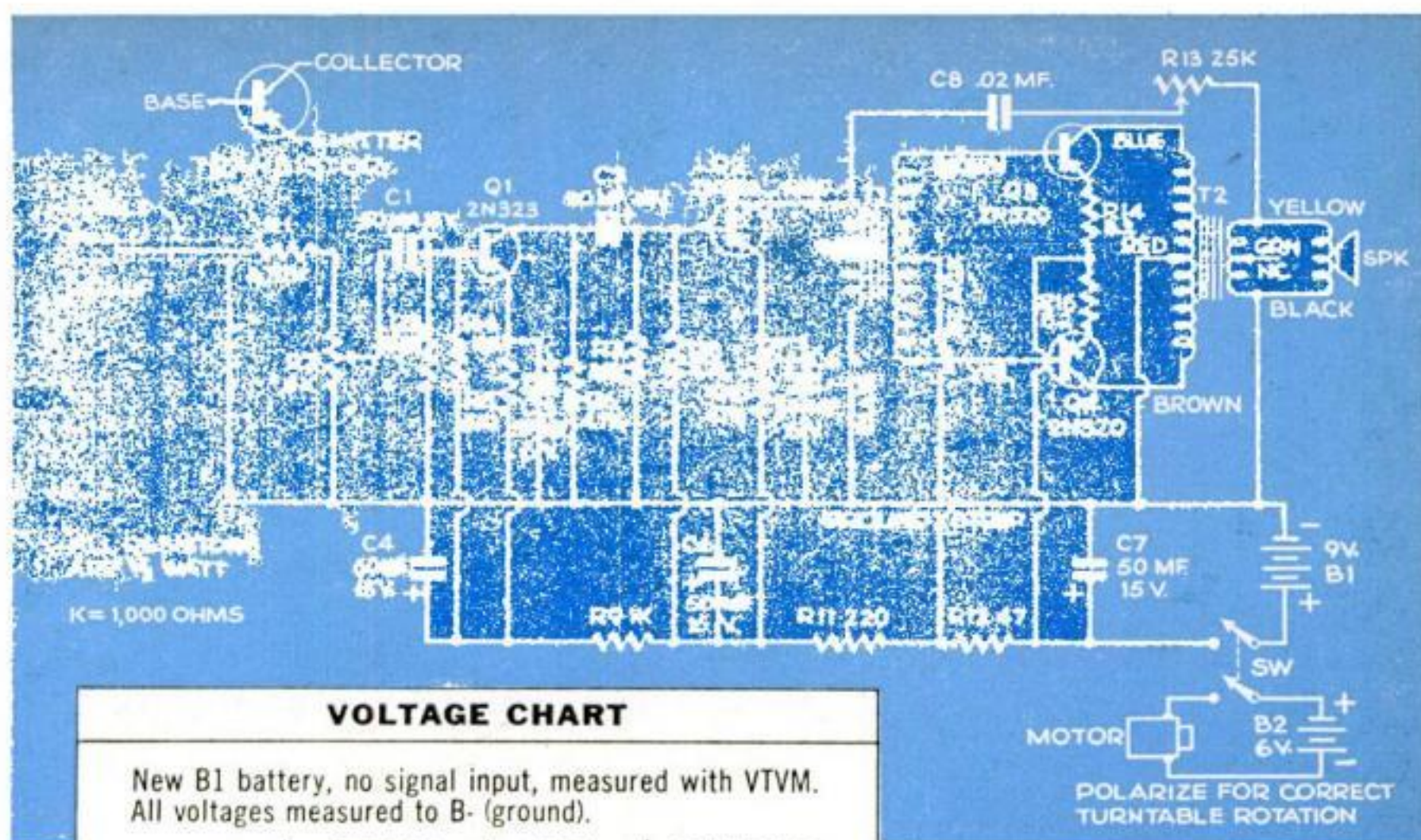
til the arm will not swing no matter how the base is tipped.

Before pushing the hinge pin back in place, rotate the pivot assembly 180 degrees so that the tab that held one end of the counterbalance spring is toward the cartridge. Bend the tab down until its tip is about 5/16" below the level of the hinge pin, then reassemble. A new, lighter spring will be needed. The one used here came in a Walsco #7421F spring assortment. It should be able to give about eight grams' tracking force within the range of adjustment. Adjust the pickup cartridge in the arm so its axis is at an angle of 28 degrees to an imaginary line joining the pivot point of the arm and the stylus. With this off-

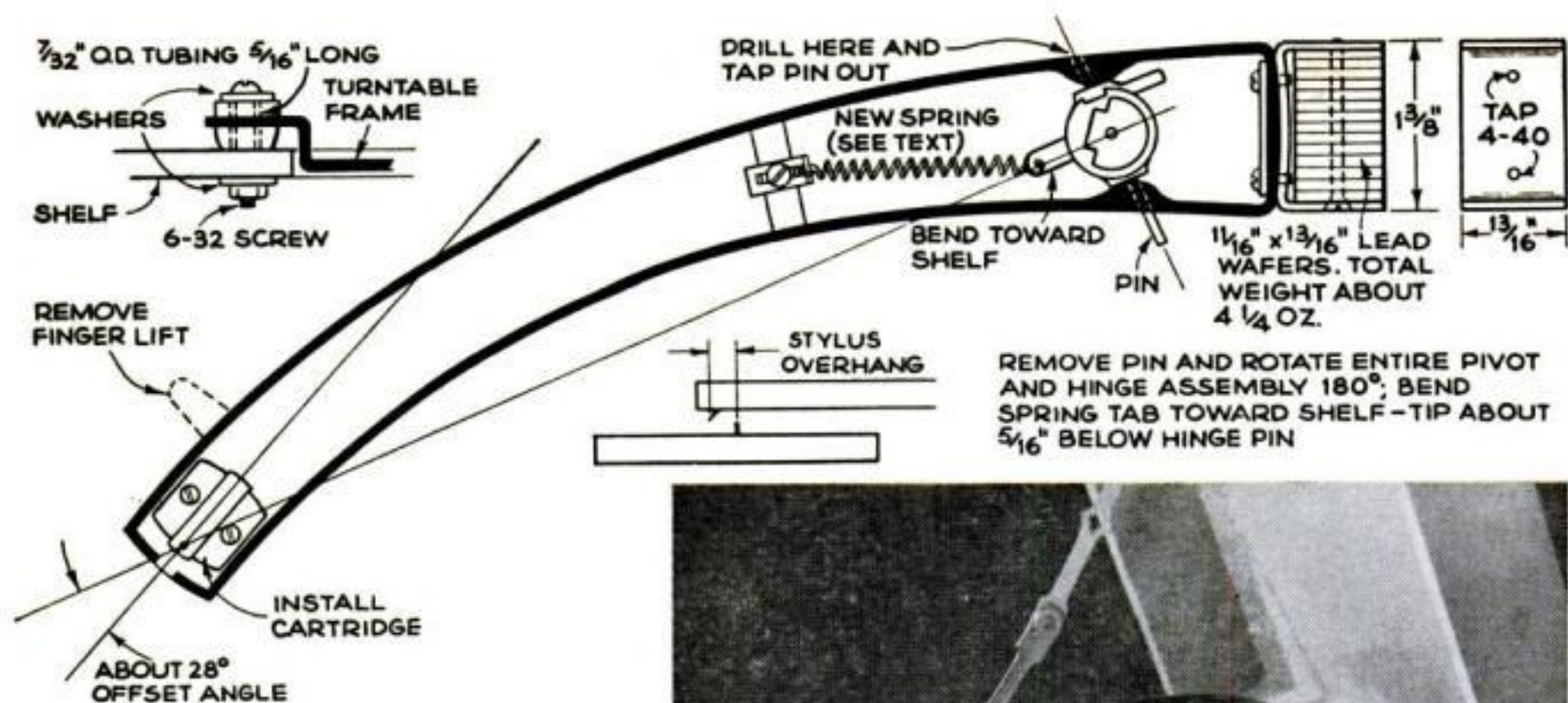


**MOTOR BOARD** is flipped over here to show details underneath. Notch near far corner is to allow clearance for speaker. A slanting hard-board cover closes the opening. One wooden stiffener is notched to clear the motor.

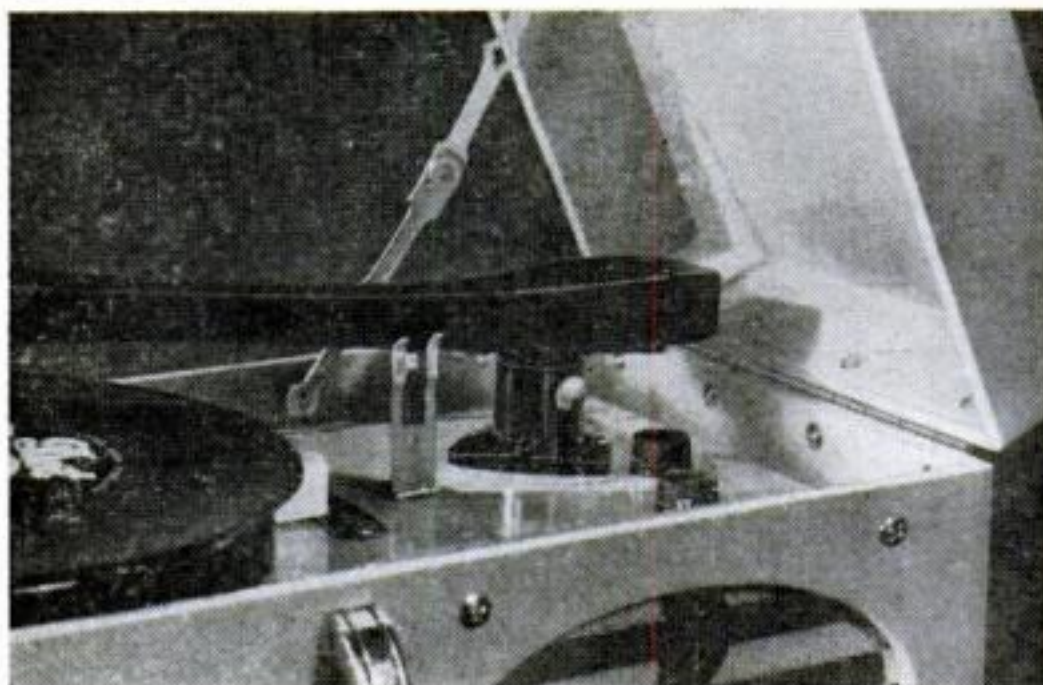








**TONE-ARM MODIFICATIONS** are shown from underneath in large sketch. Detail at top shows motor support with metal sleeve to prevent squeezing rubber grommets. Sketch at right shows how to measure overhang. In photo, note hinged support for securing tone arm in transit. It folds down for playing.



set angle, the arm should be mounted so the stylus overhangs the turntable center  $25/32$ ".

**The transistor amplifier.** The amplifier is assembled on a chassis of perforated phenolic material. Transformers, transistors, volume control, and tone control are mounted on one side. Most of the resistors and capacitors are on the other side of the board, held in place by their leads. A piece of brass shim stock attached along one edge and part of another simplifies making the many "ground" connections.

Flea clips are used for transistor connections. To avoid heat damage, complete the soldering before the transistor leads are inserted. Be careful here—don't let solder run through and fill up the end where the transistor leads are to be inserted.

As an extra precaution, the power-output transistors are provided with heat sinks to help dissipate heat. Cut two pieces of  $3/8$ " copper tubing 1" long and split them on one side. Spring them open just enough to make a tight fit and slip them over the transistor cases.

**Turntable and switch.** The turntable control lever usually comes mounted on the wrong side for this application. Re-

move the rivets and remount the lever as shown in the photo on the preceding page, using alternate mounting holes provided. Alter SW, a DPST slide switch, to remove the detent action. Simply bend back the tabs holding the switch together and reverse the thin metal plate inside that provides the detent. Drill a hole in the knob to receive a spring made from a cut-down safety pin. This switch will be mounted so that the spring forces it "on" when the turntable control lever is moved from the "off" position.

**Laying out the motor board.** To keep the unit compact, little leeway is allowed in the dimensions for clearances. It's wiser to lay out the parts on cardboard, mount them temporarily, and check clearances. The lid should clear the tone arm when the stylus is in the first groove of a 7" record. Check the lid support for interference with a 12" record. With your cardboard template as a guide, cut the permanent motor board from  $1/8$ " tempered hardboard. Glue the wood stiffeners in place as shown. Sponge rubber, cemented to one block, holds the batteries in place when the motor board is tightened down.

Mount the turntable with machine

[Continued on page 222]





# 20-Buck Dinghy for the Kids

By Henry Clark

## ATLANTIC LUMBER CO.

$\frac{1}{4}$ " x 4' x 8' Exterior Plywood A-A	6-
$\frac{3}{4}$ " x 1 $\frac{5}{8}$ " x 36' Mahogany (Chines, Rub Rails)	3 <sup>70</sup>
$\frac{3}{4}$ " x 2 $\frac{5}{8}$ " x 8' Mahogany (Battens)	1 <sup>20</sup>
$\frac{3}{4}$ " x 14" x 6' Spruce (Bow, Transom)	2 <sup>25</sup>
1 $\frac{1}{8}$ " x 9 $\frac{1}{2}$ " x 4' Vert. Grain Fir Stepping (Seat)	1 <sup>75</sup>
$\frac{3}{4}$ " x 1 $\frac{5}{8}$ " x 20' Clear Redwood (Keel, Cleats)	1 <sup>15</sup>
$\frac{3}{4}$ " No. 6 Galv. Screws—2 Gross	2 <sup>05</sup>
2 $\frac{1}{2}$ " No. 8 Galv. Screws—8	1 <sup>5</sup>
Ribbed Boat Nails— $\frac{1}{4}$ lb.	5 <sup>5</sup>
Waterproof Glue—1 lb.	1 <sup>05</sup>
	<u>\$19<sup>85</sup></u>

**Dad, too, can use this sturdy, 35-pound lightweight—as a car-top fishing skiff or as a tender for a bigger boat**

**F**OR \$20, give or take a buck, you can easily put together this eight-foot dinghy—most of it from a single 4'-by-8' panel of  $\frac{1}{4}$ " plywood. Though lumber and labor are cut to the bone, you still come out with a durable, stable boat that will do 12 m.p.h. with a three-hp. outboard.

The exterior-plywood panel can be bought for about \$6 at almost any lumber yard. On it you lay out the two side and three bottom pieces. Cut out the sides first with a hand- or portable-electric

saw; leave the bottom pieces until later. Then shape bow and transom from  $\frac{3}{4}$ " spruce boards. You will probably have to butt separate pieces and glue them together. Side edges on both pieces must be beveled—five degrees on the bow piece, 15 degrees on the transom piece.

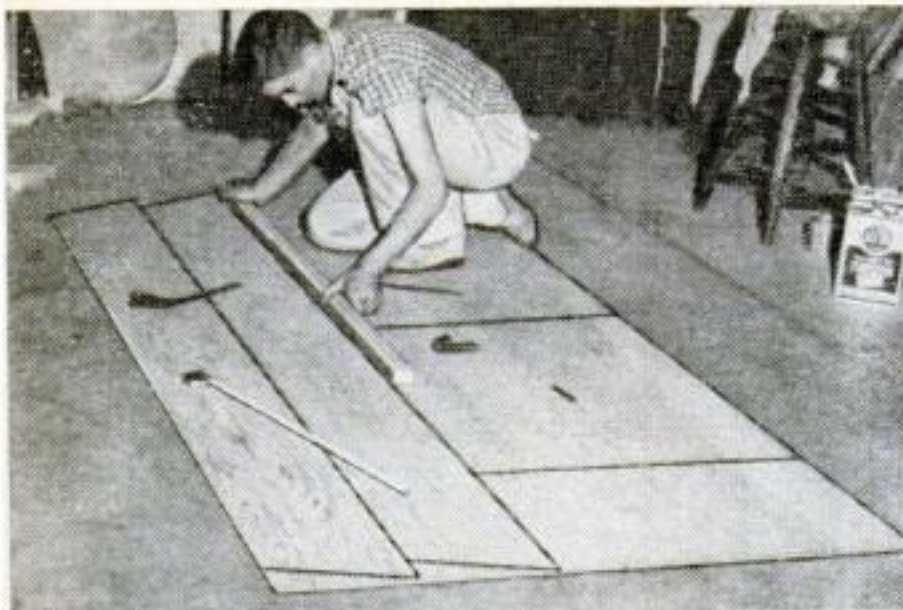
Now begin assembling the dinghy on the simple jig of two-by-fours shown on page 150. Set the two side panels in place, tacking them to the jig blocks on the transverse beam. The bow and transom go on next, top edge down, at right angles

CONTINUED

147



## Sides and bottom come from one plywood panel



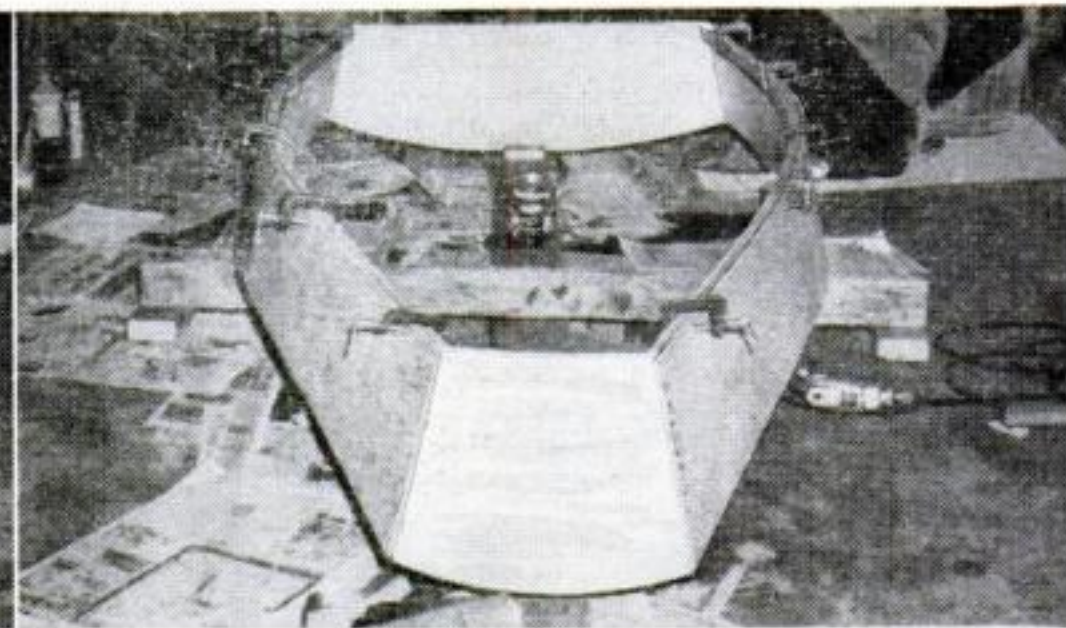
**TWO SIDE AND THREE BOTTOM PIECES** just fit. Thicker plywood ( $5/16''$  or  $3/8''$ ) would make a stronger boat but one with less freeboard.



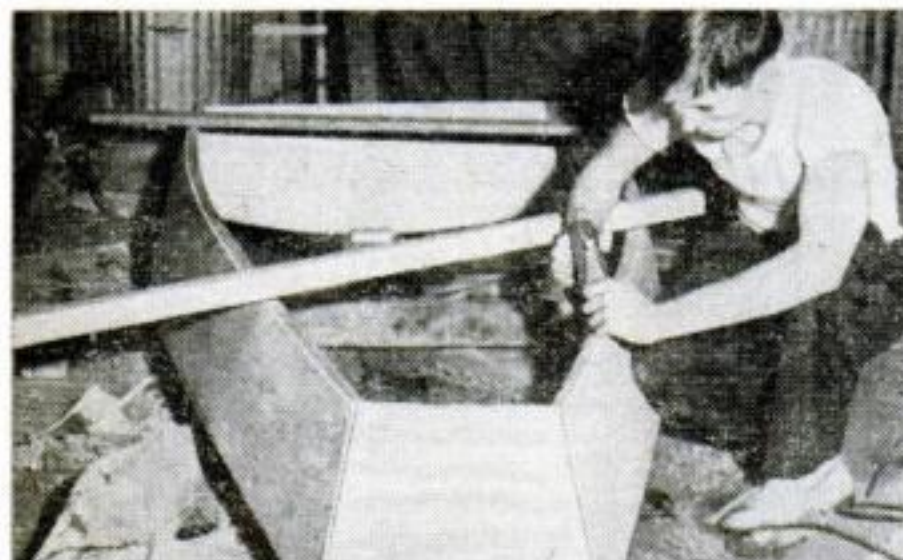
**JOINTS BETWEEN SIDES AND ENDS** are sealed with linen strips soaked in glue. Tightening screws squeezes linen between pieces of wood.



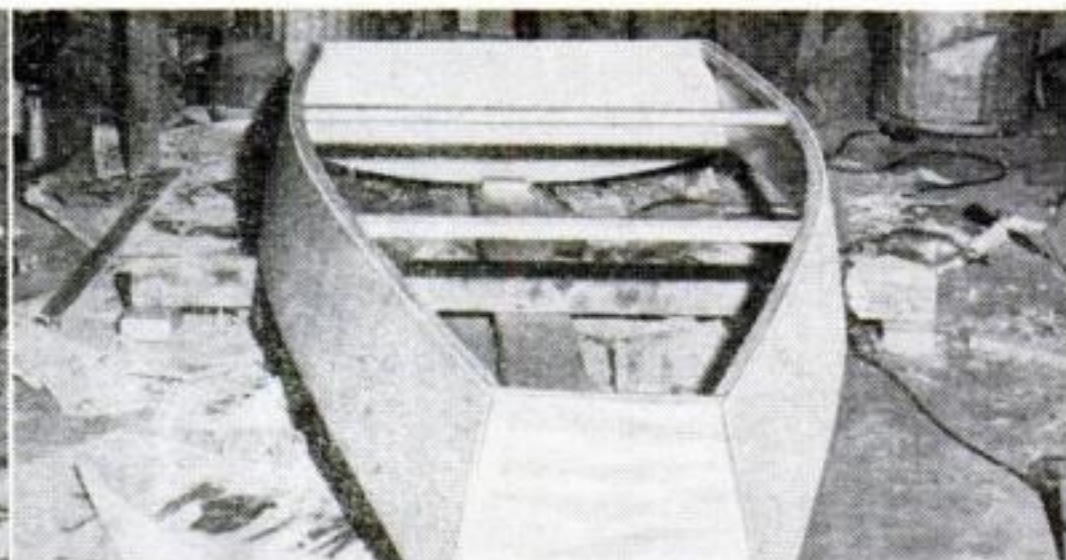
**ROPE HOLDS SIDES TO BOW** while screws are driven. Sides are tacked to the ends to position them first; then pilot holes are bored.



**CHINES ARE CLAMPED** to protrude  $1/4''$  above side edges. After pilot holes are drilled, chines are removed, swabbed with glue, and reclamped.



**CHINES ARE BEVELED** to get them even with the side edges. As they're planed, the surface is checked for flatness with a long stick.



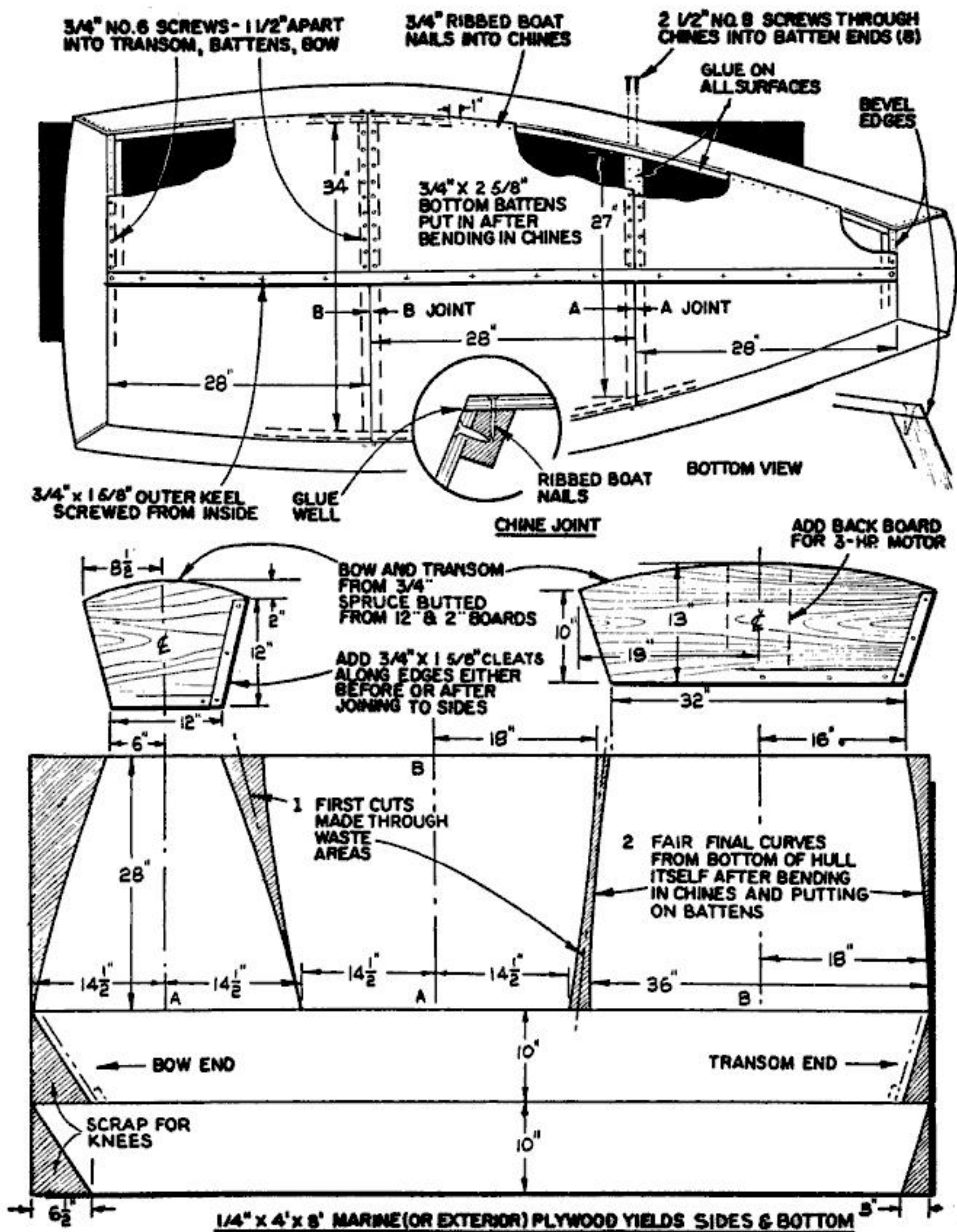
**TWO BOTTOM BATTENS** make the hull ready to receive the bottom pieces. The three pieces are butted on the battens and screwed to them.

to the jig's main beam. Tack the side panels to them temporarily. Then nail struts on the bow and transom to brace them in place against the floor.

After the sides and ends are lined up and nailed loosely together, fasten them permanently. Drill pilot holes for screws through the sides into the bow and tran-

som pieces. Then pull out the temporary nails, one joint at a time, gluing and screwing each joint in turn. Apply two coats of glue along the joints before you run screws in. Let the first coat soak in and dry; apply the second to both sides of a linen strip. The strip is squeezed between side and end piece, filling the





joint when you tighten up the screws.

Chines go in next. Like battens and rub rails, they are of mahogany. This wood bends without cracking, holds screws well, and is easily planed. Use the cut-and-try method to make the chines lie flat against the boat's sides. Bevel front and rear ends to fit, and

clamp the chines in place so 1/4" protrudes above the side panel. Drill pilot holes through the sides into the chines, unclamp them, and swab with waterproof glue. Reclamp chines and drive in screws.

To make a flat surface for the bottom pieces to rest on you must bevel the chines and the bottom edges of bow and



## Adding the bottom panels and rub rails completes the hull



**BOTTOM IS SCREWED ON** over glue-soaked linen strips that fill voids. The pieces are fastened to the chines, battens, bow, and transom.



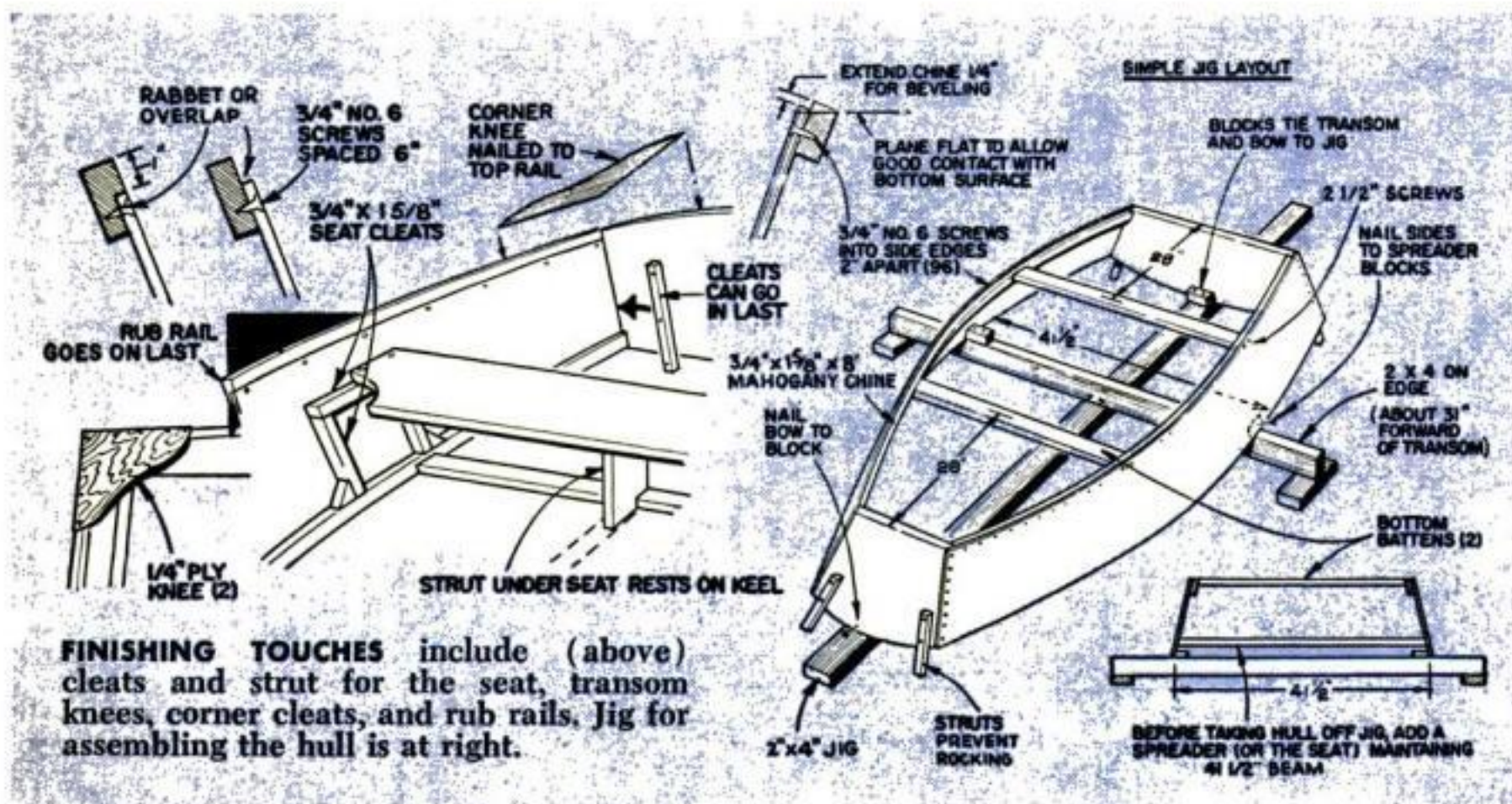
**RUB RAILS ARE CLAMPED** to the gunwales and screwed in place. They can be rabbeted, or left plain and lapped over the gunwale.

transom. Check them with a straightedge as you plane, to even out dips and rises. Then fasten the battens in place by driving screws in through the chines.

Cut out the three bottom panels and line them up on the hull so they butt tightly over the battens. With a few screws positioning the bottom pieces, scribe the hull outline on them by running a pencil along the chines from inside the boat. Remove bottom pieces, trim them to within  $\frac{1}{8}$ " of the scribed lines, and replace. Drill pilot holes through the bottom into battens, chines, bow, and transom. Remove panels again to apply glue. Glue and screw one panel down at a time. When the glue has dried thoroughly, plane the chine edges flush with the sides.

Lay on the outer keel and scribe its outline on the bottom. Remove the keel and drill pilot holes through the bottom between the lines scribed. Now glue on the keel and drive screws through it into bow, transom, and battens. Flip the boat over and drive more screws, through the pilot holes just made, into the keel. Put the seat in to maintain a  $41\frac{1}{2}$ " spread between gunwales; remove bracing.

Finish up with rub rails along the top edges of the sides, two corner knees at the transom for rigidity, cleats in the corners, and seat braces. Glue a clamp board to the outside of the transom if you plan to hang on an outboard motor. Before painting, cover the boat inside and out with two coats of Firzite.







## know-how file

*Tips from the experts on—*

# The Modern Way to Remove Wallpaper

*... and what to do when  
you can't get it off*

**OLD PAPER PEELS OFF EASILY** with this new home-size steamer. Lightweight, it works as simply as a pressure cooker, can be rented for a few dollars a day.

**R**EMOVING wallpaper is no longer the tedious, messy job it used to be. Now you can rent a small, portable, home-size steamer that peels off the paper for you. The combination of heat, moisture, and pressure loosens the paper much faster than the old method of soaking it with water.

Until recently, the only steamers available were complicated machines for professionals only. The new units are trim little home appliances as safe and simple to operate as your wife's pressure cooker. You can rent one for \$3 to \$5 a day at many paint, hardware, and tool-rental stores. In a day's time you can do up to two complete rooms.

One manufacturer of the new steamers sold 15,000 units last year alone to stores planning to rent them. Tool-rental agencies all over the country report that the home wallpaper steamer now ranks third or fourth on the list of most frequently rented tools. You should be able to find one in most fair-sized towns. If not, it

may be worth a trip to a neighboring city.

**How they work.** There are two common types of home steamers. The smallest and lightest is the all-electric model. It weighs about 35 pounds, is easily carried, and fits in any car trunk. It is particularly well suited to home use as it draws only 10 amps and can be operated on ordinary house current. You just plug it in and the rest is automatic. It turns itself on when heat is required and off when sufficient steam pressure has built up. Safety valves insure that the steam can't get out of hand.

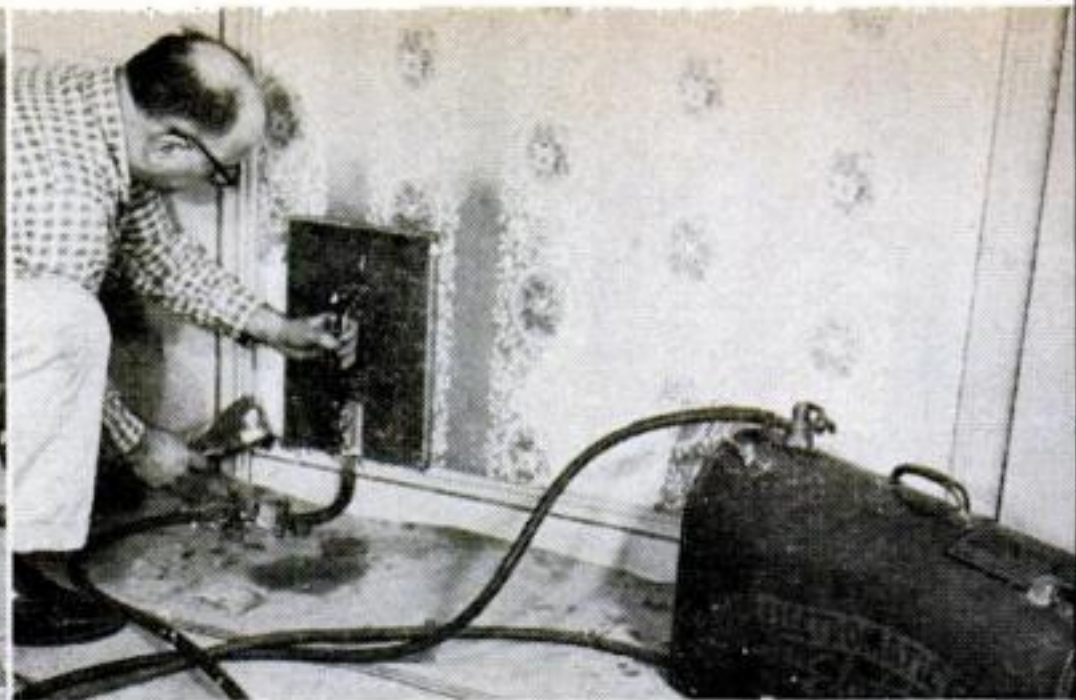
This type holds about six quarts of water—enough to do a 12'-long wall. There's a waiting time of about 20 minutes between fillings to build up steam, but you can shorten the time by filling the tank with boiling water instead of cold.

"Kero-electric" steamers burn kerosene to create steam, while a small electric motor maintains proper fuel flow.





**FILLING THE STEAMER** with water is the only preparation required. Completely automatic, this all-electric model keeps steam at the proper pressure and shuts itself off when the water level drops too low in the boiler.



**PRESSING THE PAN** against the wall forces steam out holes and into the paper. Start at the bottom of the wall and work upward so the rising steam helps to loosen the paper above. Trigger on the pan controls the flow of steam.

These have more capacity than all-electric models. They hold 4½ gallons of water and can provide steam steadily for hours without a halt. They weigh about 60 pounds, but can be taken apart for carrying.

If the burner is operated correctly with a blue flame, the kerosene will not give off odor or soot. Windows should be kept open, however, when using any steamer to prevent excessive accumulation of moisture in the house.

One disadvantage of a steamer is that it can't be used if you have a papered ceiling that you want to protect. The steam, rising from the walls, will loosen the paper on the ceiling.

**Applying the steam.** A flat pan with a long hose carries the steam from the boiler to the wall. You hold the pan against the wall and the steam flows out through small holes in the underside.

A trigger on the pan's handle lets you control the flow of steam. You hold it on for about half a minute, then shift the pan to another spot while you strip off the softened paper with a putty knife. You work with both hands—one to hold the pan and one to scrape—because the paper dries very quickly.

**Stripping off the paper.** Scrape carefully at first with the putty knife to see if the paper is loose. Watch your step on plasterboard walls until you're sure that the paper will come off without pulling away the surface of the plasterboard with it.

Try to slip the blade under the bottom

layer so you remove all of the paper at once, instead of a layer at a time. Scrape off small specks immediately before they dry and harden.

If the paper fails to come off easily, give the spot a few extra shots of steam. After a few minutes, you'll get the feel of just how long to keep the pan on one spot for best results with your particular wall condition.

Because some steam escapes from the pan and rises along the wall, it's best to start at the bottom and work upward to get the benefit of its loosening action.

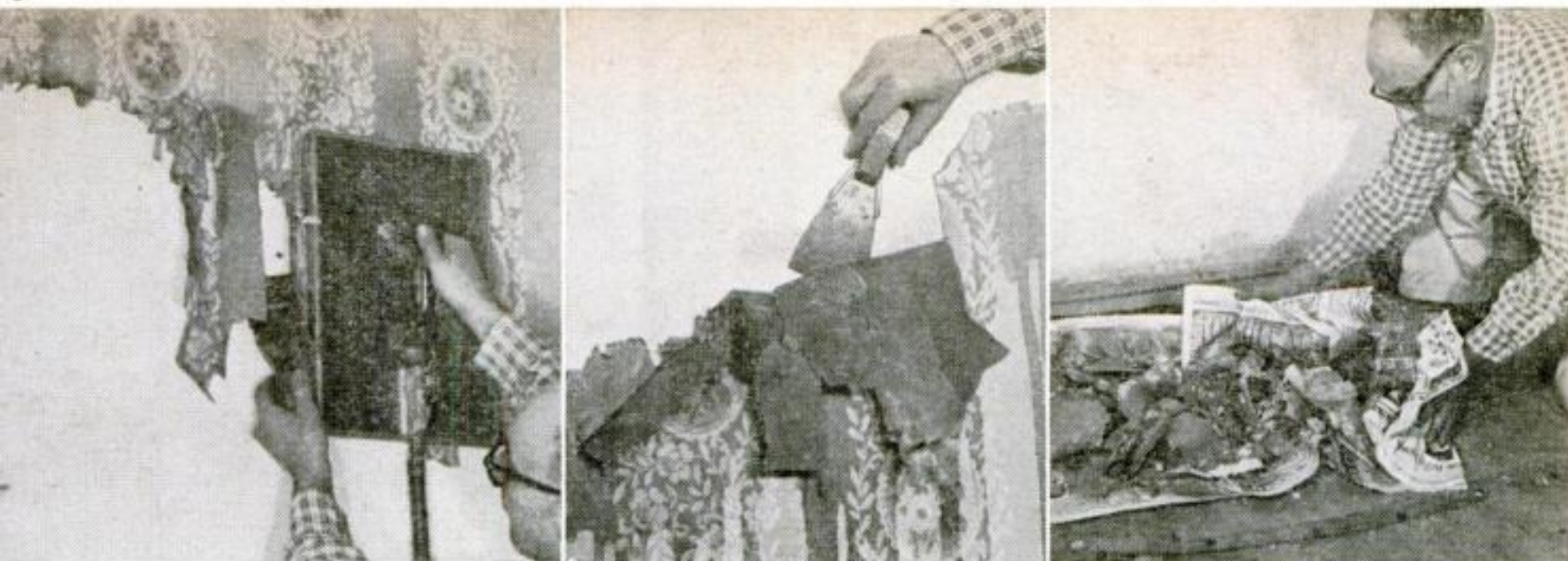
Wash down the stripped walls with clear water and a sponge and sand off any paper specks that remain. Then fill any small cracks and dents with patching plaster.

**When must the paper be removed?** You can put new paper over old provided it's sound and there aren't too many layers. The best rule: If there are three or more layers already on, or the wall is cracked, remove the old paper first.

Paper that has built up to more than three layers thick is not likely to provide a smooth and durable foundation for new paper. In the end, the new paper will be ruined by the worn or cracked old paper and it, too, will have to come off.

**Soaking the paper.** You can also use the brush method, which works well except that it's slower and messier than steaming. Use hot water and brush it on one entire wall at a time, working from the top down. Some people prefer to use a pump-type garden sprayer to





**WORK WITH TWO HANDS**, holding the steamer pan with one and scraping with the other, to speed up the job. Where possible, use downward scraping strokes, as at center above, so that the paper's own weight helps to peel off the strips.

Unusually hard-to-remove spots may need a second burst of steam. Clean up as you do each wall, rolling the scraps into newspaper (above, right). This way, you'll avoid tracking sticky bits of old wallpaper through the house.

apply the water, but the brush method gives better control.

If there are many layers of paper, it may take three or four brushings to soak through sufficiently. If you find any spots that seem to dry out too quickly, scrub them with the brush to break through surface grease.

Chemical wallpaper "removers" do not in themselves take off the paper. They are wetting agents that make the water penetrate the paper more readily. Some additives are really detergents that cut through greasy coatings. Such chemicals are useful and inexpensive, though not always necessary. If you use them, add them to the water according to the manufacturer's instructions.

When the paper is soaked enough to penetrate and soften the glue at the back, it is then stripped off the same way as in the steaming method.

**Removing ceiling paper.** If you have only the ceiling to do, it's doubtful whether holding a steamer pan overhead is much faster or easier than the brush-soaking method. But if you have both ceiling and walls to do, steamers are ideal because of the extra loosening action of the rising steam. Do the walls first, and by the time you reach the ceiling a good part of the removal job will have been done for you.

Work across the narrow dimension of the room and you'll find that you won't have to shift the ladder as often. Some workers prefer a large paint roller or a pump sprayer for soaking a ceiling.

Working steadily, it takes about three hours to do a 12'-by-15' ceiling.

**Unsticking waterproof papers.** The thin plastic coating on waterproof papers poses a tough problem because the water can't get through to the paste. You can't put new paper over it because the slick surface offers poor adhesion. If you're not sure whether the paper is the plastic type, test it with ink or some oil. If the paper becomes stained, it is not plastic-coated.

There are several ways to break the plastic surface. One is to sand off the thin coating (you could use a power sander of the orbital type, but don't try it with a belt sander.) Hand sanding is slower but quite effective. Another way is to scrape the surface with a cheese grater or slash it with a razor blade. Make long crisscross slashes across the wall a foot apart, working from top to bottom.

A steamer, or repeated brushing with water, should now penetrate sufficiently to loosen the paste. The paper may come off in small diamond-shaped pieces, but the job will go quickly nonetheless.

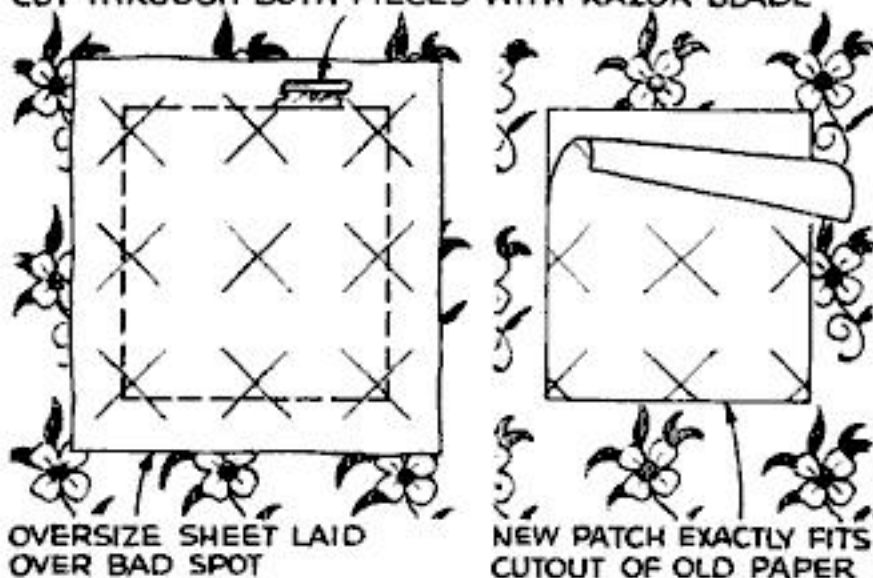
**Textile-backed wall coverings** (Sanitas, Walltex, etc.) are the easiest to remove as the cloth simply is pulled right off the wall without any steaming or soaking. Start at any corner or along a molding where you can get an edge of the knife under the covering and pull slowly to the side.

There are a few precautions: Don't pull straight out. Ease the covering off



## How to patch a bad spot

CUT THROUGH BOTH PIECES WITH RAZOR BLADE



**LAY NEW PAPER** over a torn or soiled spot in the old paper and cut through both layers at the same time with a razor blade. Soak the area with warm water to remove the bad spot, then paste the new paper in its place. You'll find that the patch makes a perfect fit.

## Unsticking waterproof paper



**WATERPROOF PAPER** won't let moisture reach the back and is thus hard to remove. Make diagonal slashes every 12" with a razor blade and these will let the moisture seep through.

in a direction parallel to the wall to avoid breaking out lumps of loose plaster and to minimize tearing off threads that stick to the wall and must be scraped off separately. If you do come across any stubborn spots, dampen the back of the paper with water.

In some cases, glue is added to the wheat paste for this type of covering because of its considerable weight compared with paper. If freeing the covering from the wall is very difficult, it may be necessary to slash the surface coating and resort to soaking or steaming.

**What to do if it won't come off.** Unprimed plasterboard walls are very hard to strip because the wallpaper won't separate from the plasterboard's paper skin. The soaking and scraping often tears off the skin and disintegrates the plaster underneath.

To prevent this, new plasterboard should be primed with a coat of flat oil paint, latex paint, shellac, or varnish be-

fore the first paper is hung. If the wall is properly sealed, removing the old paper can be done in the same way as on any other wall.

If you're in doubt about your walls, make a test on an out-of-the-way spot and stop if you see any signs of raw or crumbly plaster. In this case, your best bet is to leave the paper on, patch it up, and paint over it to provide a sound base for future paper.

But if the wall is stacked with paper in poor condition and you're determined to get it off, work with both the soaking and steaming methods this way: Wet the entire wall with one or two brushings, then apply the steamer pan very quickly to send just enough vapor through the paper to soften the paste but not the wall skin.

Work cautiously and avoid hacking away at the wall. Use the steamer pan repeatedly for short periods, rather than in long bursts as in a regular application. Where small areas of paper just can't be taken off easily, use sandpaper to cut them down flush and smooth.

**Patching old paper.** Torn and damaged paper that is left on to serve as a base for a new covering must be put into sound condition. First check for loose spots, particularly along seams and moldings and at window and door casings. Before lifting the paper to apply paste, moisten it so it will be pliable and won't crack or tear. Slip new paste under the loosened flaps and smooth them down with a sponge.

Cut out any large greasy spots with a razor blade and replace them with patches of the same thickness (don't worry about color or pattern). Hold any oversize piece of paper over the area, cut through the patch and old paper at the same time, then dampen the old paper to lift off the bad spot. The patch paper should fit perfectly. Sand smooth any bulges or cracks to the level of the surrounding paper.

If the old paper has overlapped seams, the top half of the seam can be cut off flush by running a razor blade down the sides against a straightedge. Moisten the strip, and you can then peel it off without removing the lower layer. Where the wall is badly marred by cracks and patches, a covering of muslin can be cemented over it to provide a smooth foundation for new wallpaper.





### Store Adhesives Upside Down

STAND all glue and cement containers on their heads to prevent hardening at the applicator tip or screw top. Either prop them up as shown or tape a small ring to the squeeze end and hang them. —Erik Miller, Sherman Oaks, Calif.



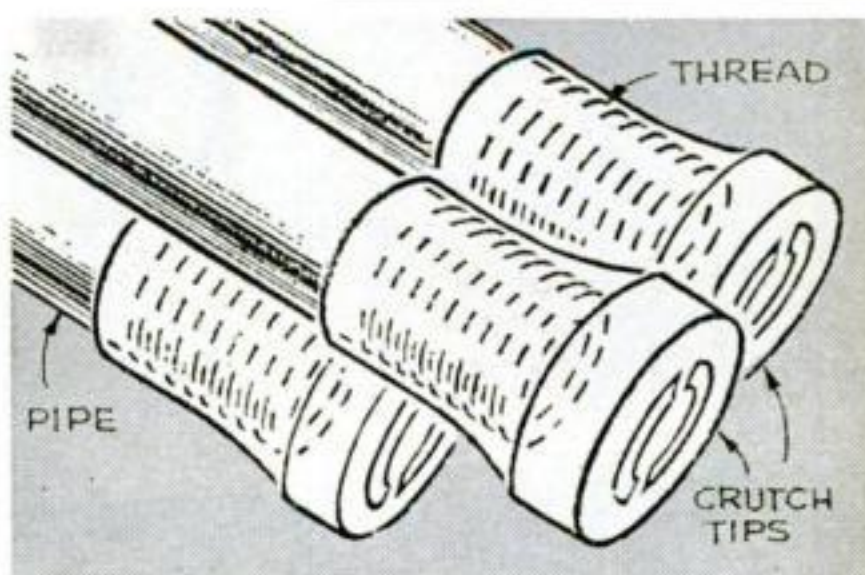
### Ventilating a Doghouse

A DOWNSPOUT elbow makes a weatherproof ventilator for a doghouse. Cut a hole in the rear gable just large enough to take one end. Once it's in place, calk around it. —G. E. Hendrickson, Argyle, Wis.

▶▶▶ I HAD already bought a vented exhaust fan for our bathroom before I realized there was no room to run the usual metal ductwork, with its space-taking elbows. So I installed the flexible, wire-bound fiber-glass duct that's used for venting clothes dryers. It came from a mail-order house complete with band fasteners, a hood for the exterior vent, and a built-in bonus: no vibration noise. —Albert P. Grenier, McHenry, Ill.

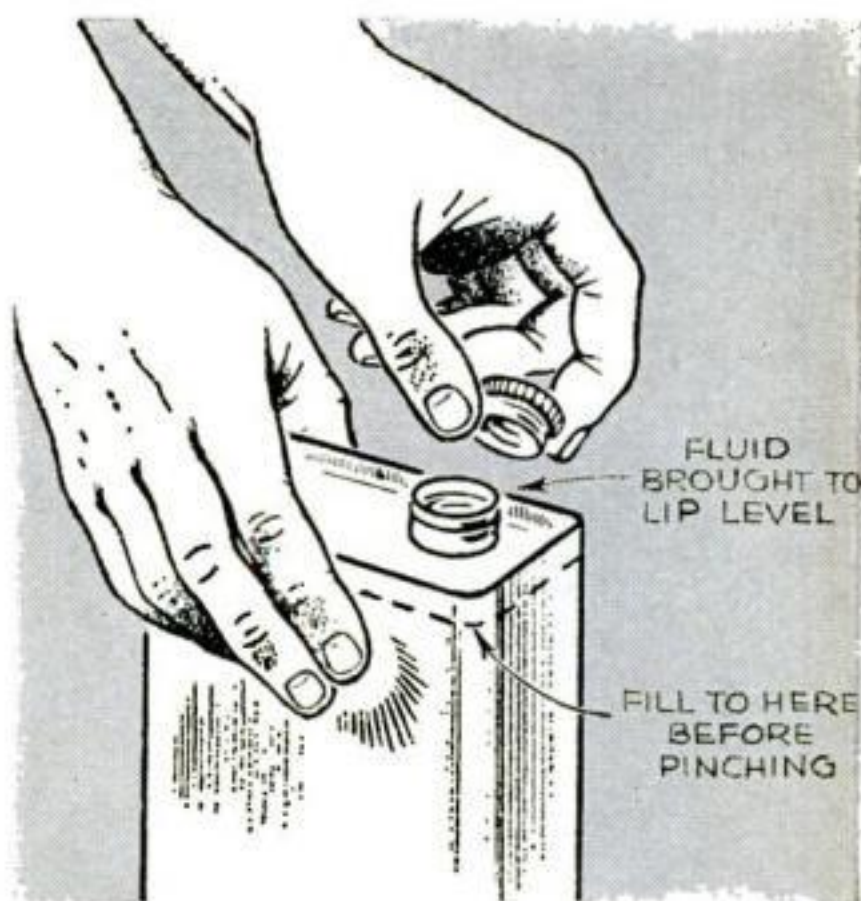
## Short Cuts and Tips

FROM PS READERS



### Protecting Pipe Threads

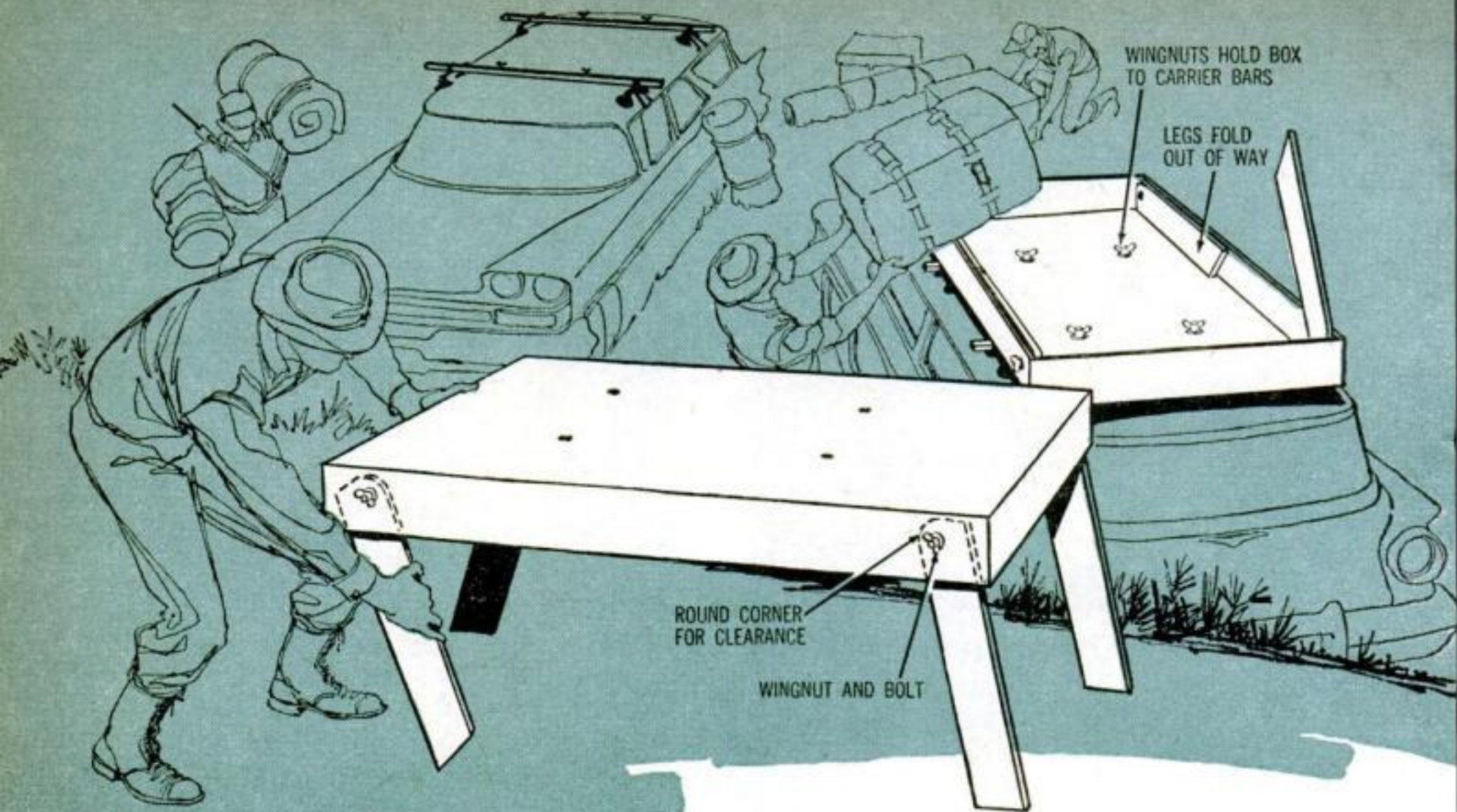
THREADS on loose pieces of pipe often become damaged in transit to the job because of rough handling. A plumber friend of mine protects the threaded ends by slipping a rubber crutch tip over them. —William B. Eagan, Maceo, Ky.



### Tight Seal for a Can

WHEN you fill screw-top cans for storage of liquids, a tight seal can be obtained by leaving just enough space at the top so that when the sides of the can are pinched the fluid level rises to the lip of the spout. Hold the level there while the cap is screwed tight, then release the finger pressure. In dropping back, the liquid creates a partial vacuum that prevents leakage if the can is tipped. —Malcolm Goodwin, Wyandotte, Mich.





**CAMP TABLE.** Add folding legs to a cartop-carrier box and you have a table. Pivot the legs off center so that, when open, they'll be braced against the floor and side of the box. Use wingnuts and bolts to replace the box on the carrier.—Paul J. Beman, Clay, N. Y.

## Camping Hints from Here and There

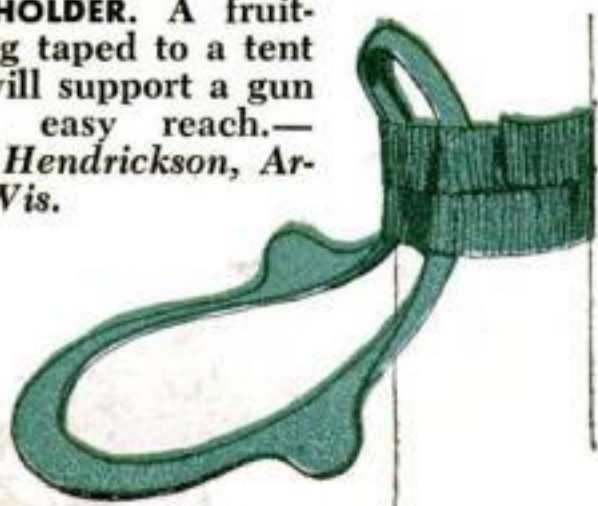


**SHAKERS.** Save a matched pair of plastic squeeze bottles with screw-on tops. Make salt and pepper shakers by drilling holes in the caps.—W. S. Head, El Cajon, Calif.



**CORK UP THAT LEAK.** What can you do about a small hole in a tent when it rains? One camper put a big-headed thumbtack through the hole from the outside, pushed it into a cork inside.—Fred Cornelius, El Paso, Tex.

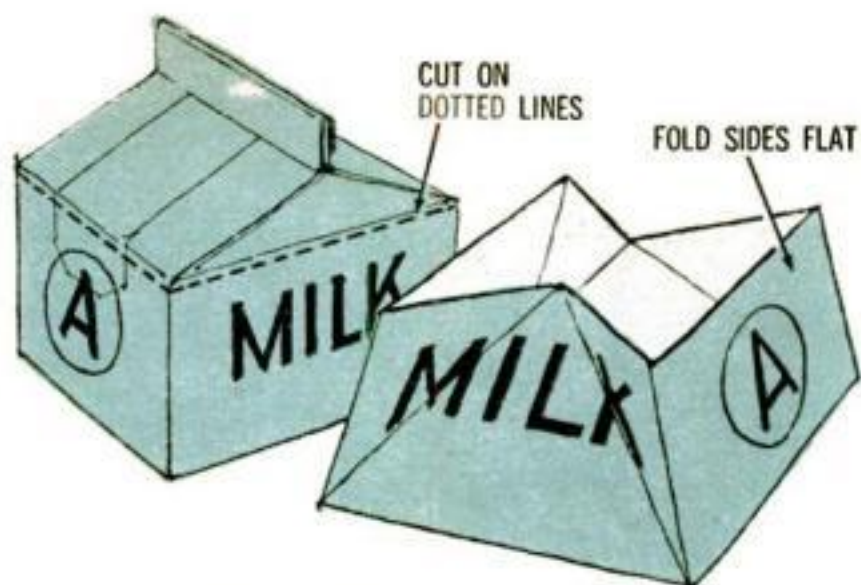
**GUN HOLDER.** A fruit-jar ring taped to a tent pole will support a gun within easy reach.—G. E. Hendrickson, Argyle, Wis.



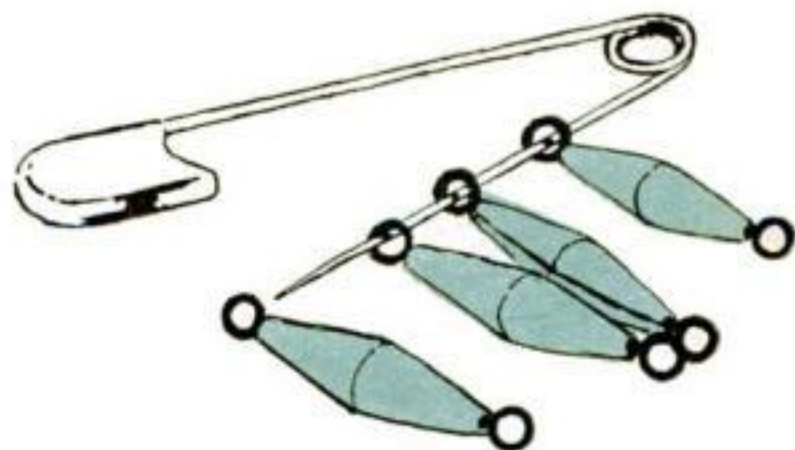
**FRESH MILK.** To keep an open can of milk fresh: Put it in a plastic bag, fold the mouth of the bag over several times and tie. Place the bag in a cold stream or lake with a large enough stone on top to keep it under the water.—John Krill, North Lima, Ohio.







**NEED A DRINKING CUP?** A pint-size milk carton cut and folded as above makes one to fit a pocket.—Ron McGee, Jackson, Mich.

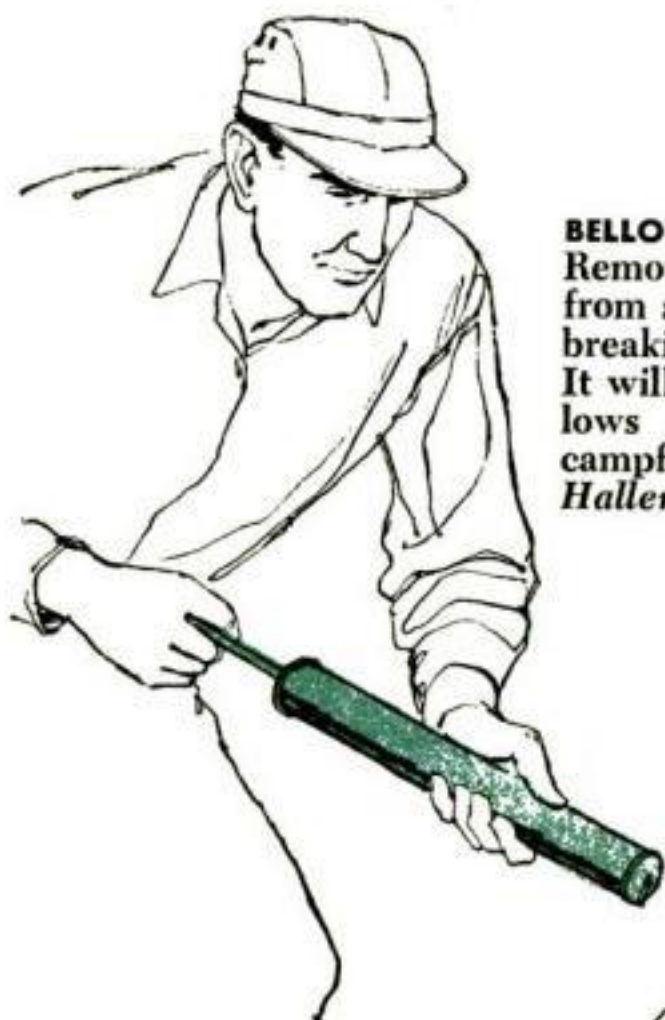


**EXTRA SINKERS.** Keep extra fishline sinkers handy this way—by stringing them on a large safety pin.—G. E. Hendrickson, Argyle, Wis.

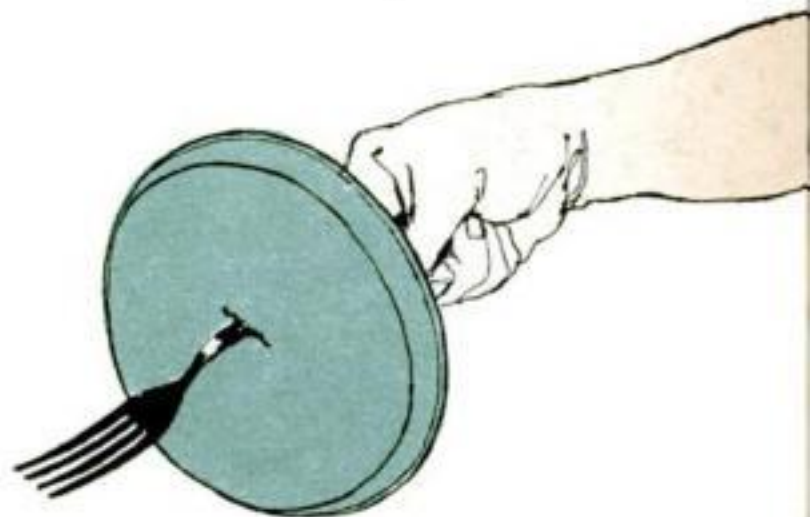


**EXTRA SHELVES.** You can carry them to the woods with you as a few pieces of hardboard or plywood suspended on knots tied in four pieces of light rope. Tie the top ends of the rope to a metal ring, hang the ring on a nail driven into a tree. Two tent pegs driven into the ground keep the shelves from swinging in a breeze.—John Franklin, Frenchmans Bay, Ont.

**TAKE A CARPENTER'S APRON** along and, when you set up camp, tie it to a tree. The pockets will hold spice boxes, cutlery, and other cooking items near the fire.—Mrs. Edwin Johnson, Iron River, Mich.



**BELLOWS FOR THE FIREMAKER.** Remove the liquid container from an old insect spray gun by breaking at the soldered joint. It will serve as an effective bellows for coaxing a reluctant campfire into flame.—James Haller, Erie, Pa.



**HEAT SHIELD.** The campfire cook should have a long-handled fork. If you forget to pack one, you can thrust an ordinary fork through a paper plate to protect your working hand from the hot fire.—Ken Murray, Colon, Mich.





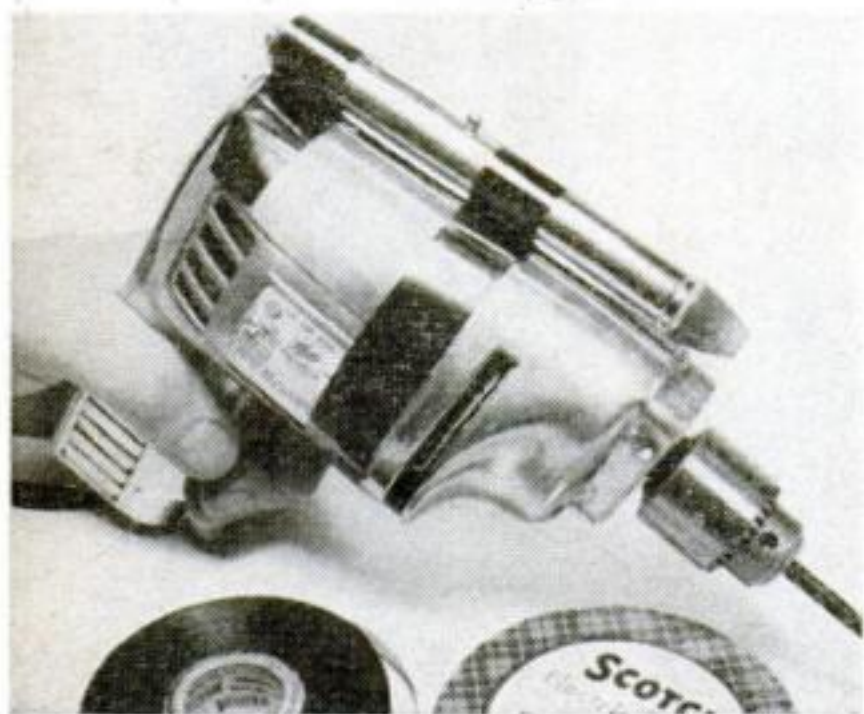
## Short Cuts and Tips

FROM PS READERS



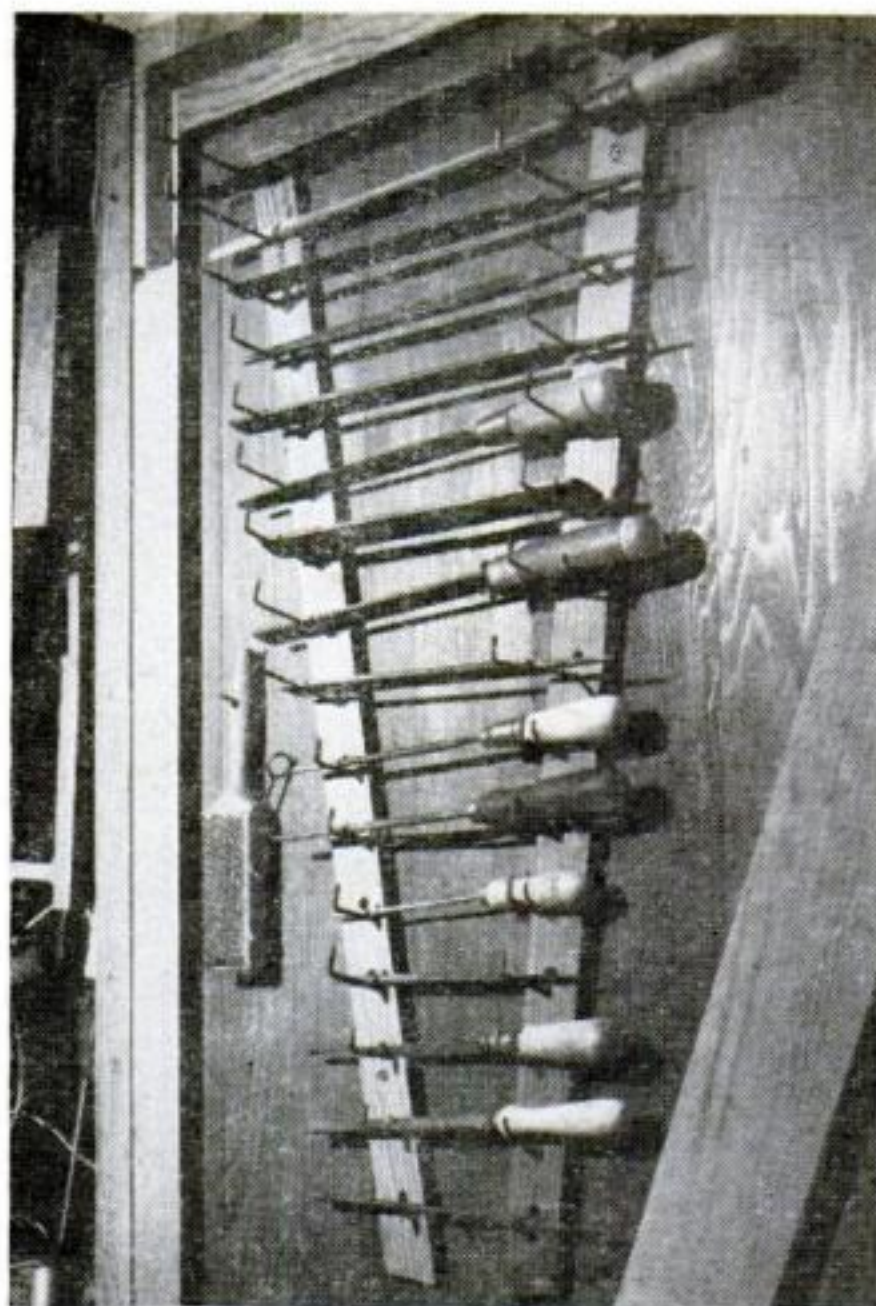
### Lever Makes Job Easier

CLAMP-ON kitchen appliances such as meat grinders usually have only a wing-nut handle to turn the adjustment screw. A common clothespin, drilled at its open end and secured over the thumbpiece with a short bolt, makes adjustment easier.—*G. E. Hendrickson, Argyle, Wis.*



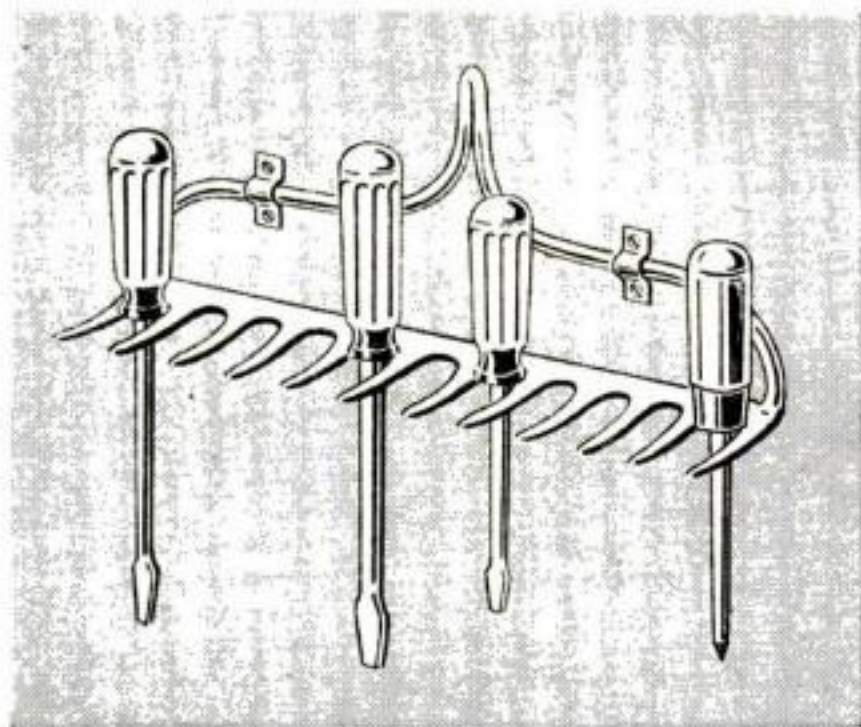
### Spotlight for Electric Drill

FOR real convenience, add a spotlight to your power drill. Just tape a small penlight to the top of the drill, as above.—*John A. Comstock, Wellsboro, Pa.*



### V-Rack for Files and Rasps

ALTHOUGH files are tough, jumbling them together in a workbench drawer will dull their edges. This wall rack protects them and permits quick selection of the right tool. The brackets are screw-hooks of various lengths.—*Erik Miller, Sherman Oaks, Calif.*



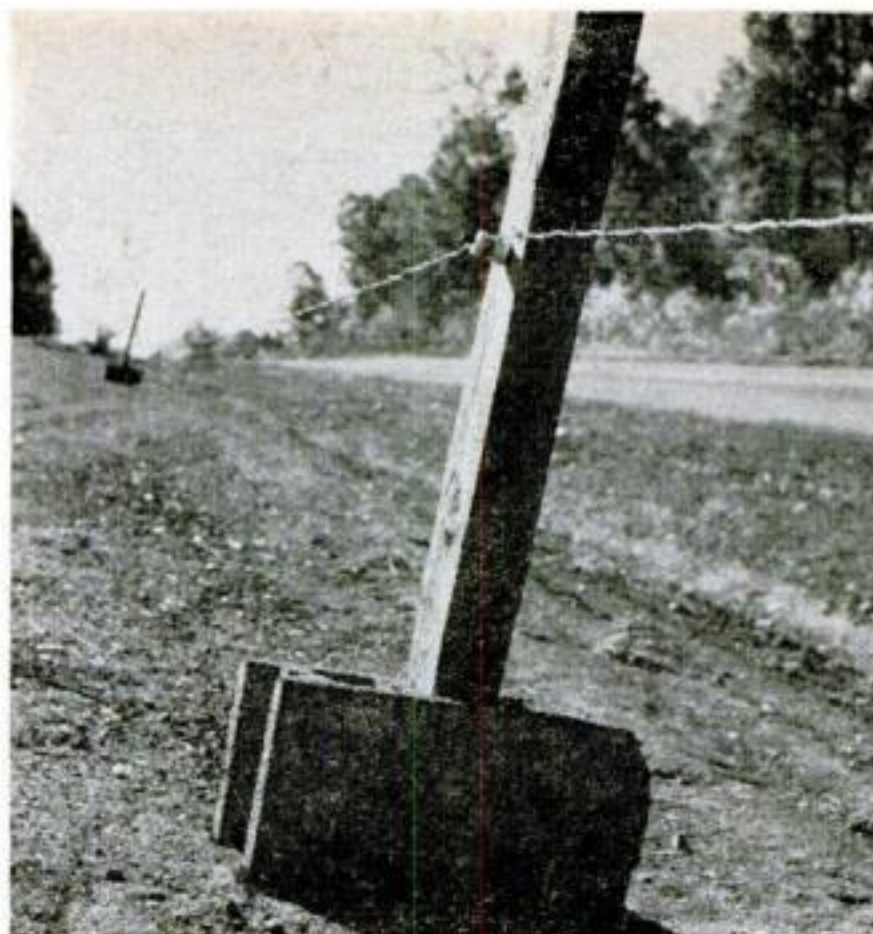
### Tool Rack from Old Rake

AN OLD garden rake, fastened to the wall with staples or brackets bent from 1/16" aluminum, makes a sturdy tool rack.—*Dave Roberts, Devon, Pa.*



## Short Cuts and Tips

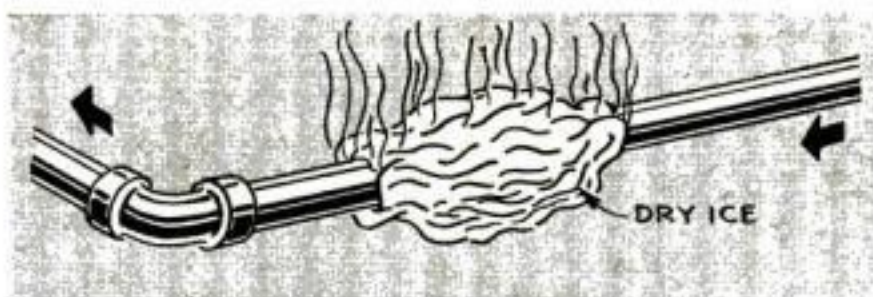
FROM PS READERS



### No Need for a Post Hole

CONCRETE blocks are used to support posts for a temporary electric fence on the Kearns Brothers farm in Randolph County, N. C.—*Jack Dermid, Raleigh, N. C.*

►►►FOR cook-outs, form two-pronged wiener-roasting sticks by rebending wire hangers. Burn off the finish on the tines.

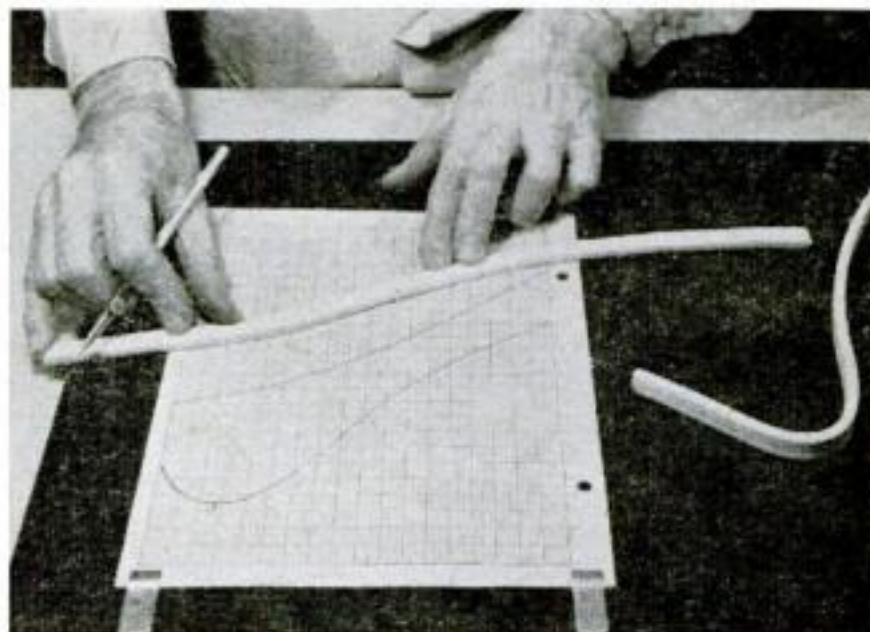


### Dry Ice as a Plumbing Aid

FOR even simple repair jobs I used to turn off my entire water system. That is—until I hit on a way of shutting off the water only where I wanted it off. Now I follow the pipe back to where it is exposed. I pack dry ice around it, holding it in place with aluminum wrap. This freezes the water. When the repair has been made, the pipe can be thawed out or allowed to thaw on its own. Caution: Wear gloves when you're handling dry ice.—*Warren J. Mundis, Poplar Bluff, Mo.*

### How to Save on Charcoal

WHEN you finish broiling steak or hamburgers in a barbecue, smother the fire with an overturned pan. You'll prevent a mess, eliminate fire danger, and save unburned charcoal for use again.—*Robert A. Brown, Shelbyville, Tenn.*



### A Guide for Curved Lines

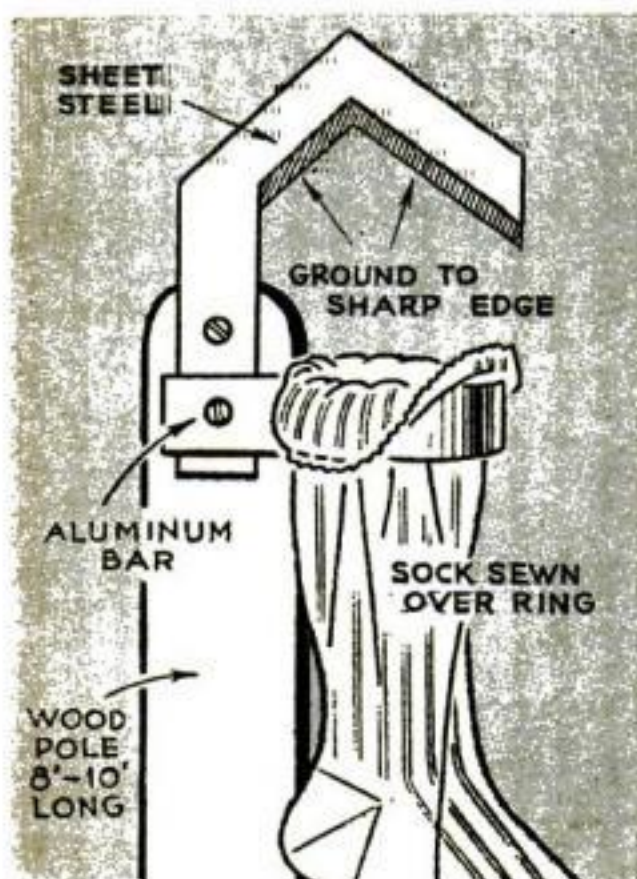
WHEN I had to make some rush drawings and found I had no adjustable curve, a couple of pieces of surface electrical cable filled the bill nicely. The cable bends easily and holds the shape well while you use a pencil or ruling pen to draw the curve. (The brand I used was Flamenol.)—*W. E. Burton, Akron, Ohio.*





## Short Cuts and Tips

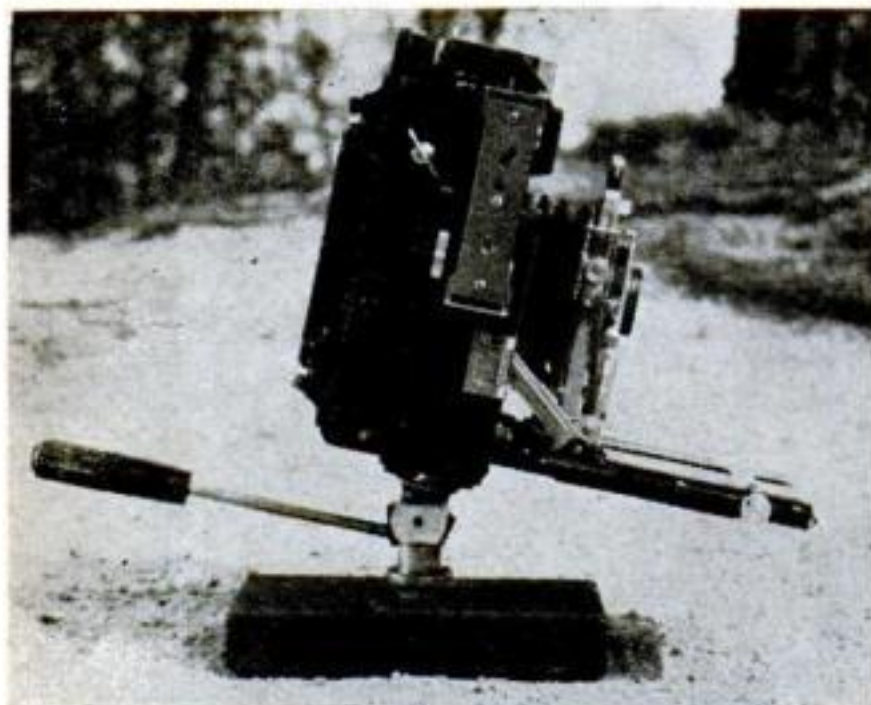
FROM PS READERS



### Long-Reach Fruit Picker from a Sock on a Pole

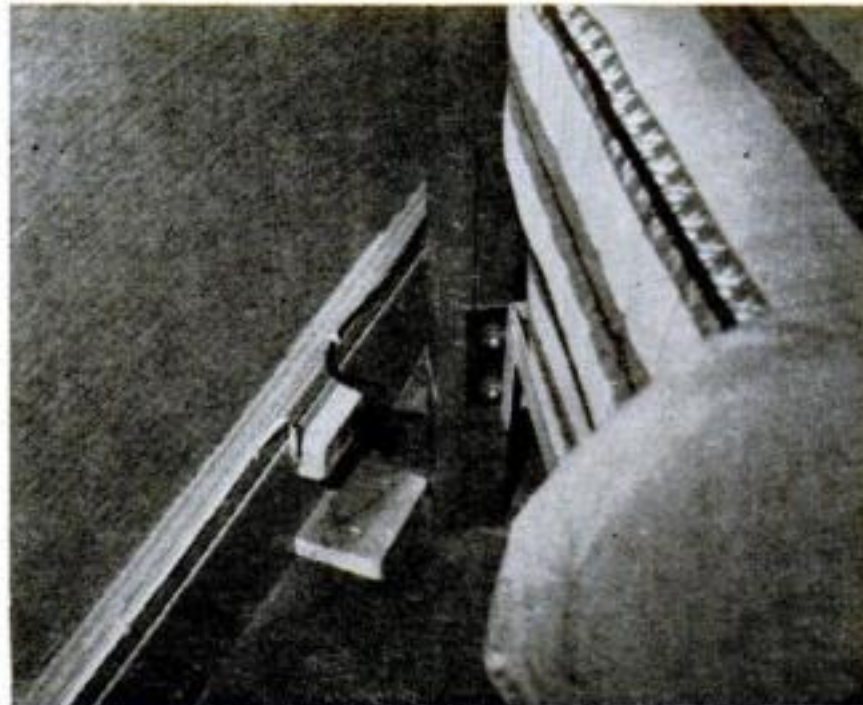
You don't need a ladder to harvest apples, pears, oranges—or even the delicate avocado—if you make this simple pole picker. Attach the two metal parts with screws and insert a man's cotton

sock through the ring, folding the top down for stitching. Several pieces of ripe fruit can be dropped into the sock, without bruising, before you lower the pole. —T. C. Garstone, Altadena, Calif.



### Support for Low-Angle Shots

THE legs of many tripods don't spread enough to shoot close-ups of small objects on the ground, such as wild flowers. This unit, which sits on the ground, is made from a piece of iron 4" wide, 8" long, and 1 1/4" thick. I drilled and counterbored a hole through the center to take a 1/4"-20 stove bolt for screwing on a tripod head. —Jack Dermid, Raleigh, N. C.



### Block Protects Floor Outlet

SURFACE-MOUNTED outlets on the baseboard are vulnerable to furniture movement; plugs even more so. A wood block about 3/4" thick by 2" by 4", screwed to the floor underneath, will protect the outlet and plugged-in fittings. The furniture leg can come no nearer the electrical parts than the outside edges of the block. —Harry Walton, White Plains, N. Y.



**A PS  
EXTRA**

## **HOW I BUILT THE Flying Cart**

**By Hubert Luckett**

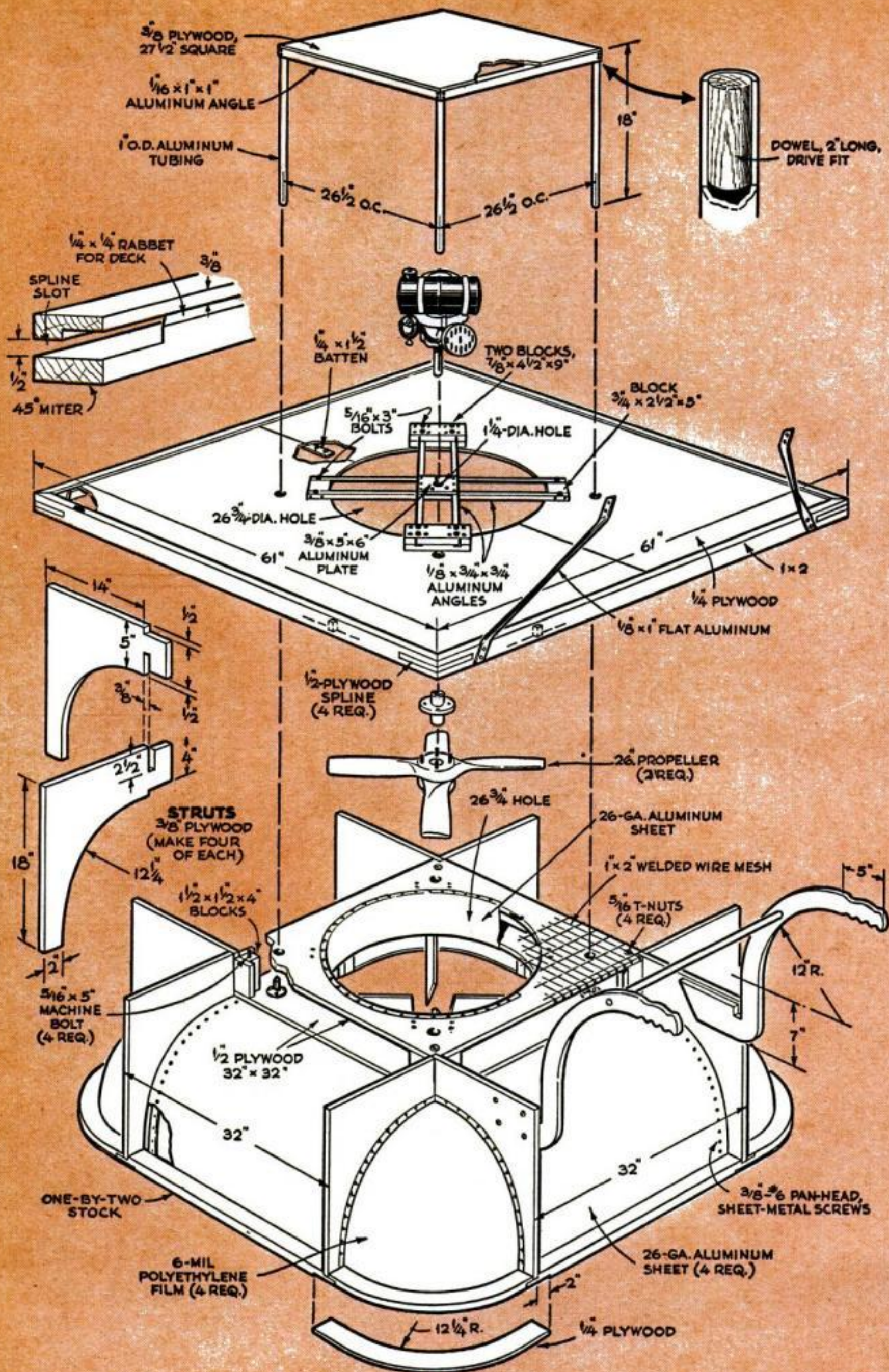
**Y**OU'RE almost ready to believe in flying carpets when you open the throttle and see a 200-lb. load float eerily off the ground. Tip the handles slightly and you have to brace yourself to keep this wheel-less Flying Cart from skittering down the drive faster than you want

CONTINUED



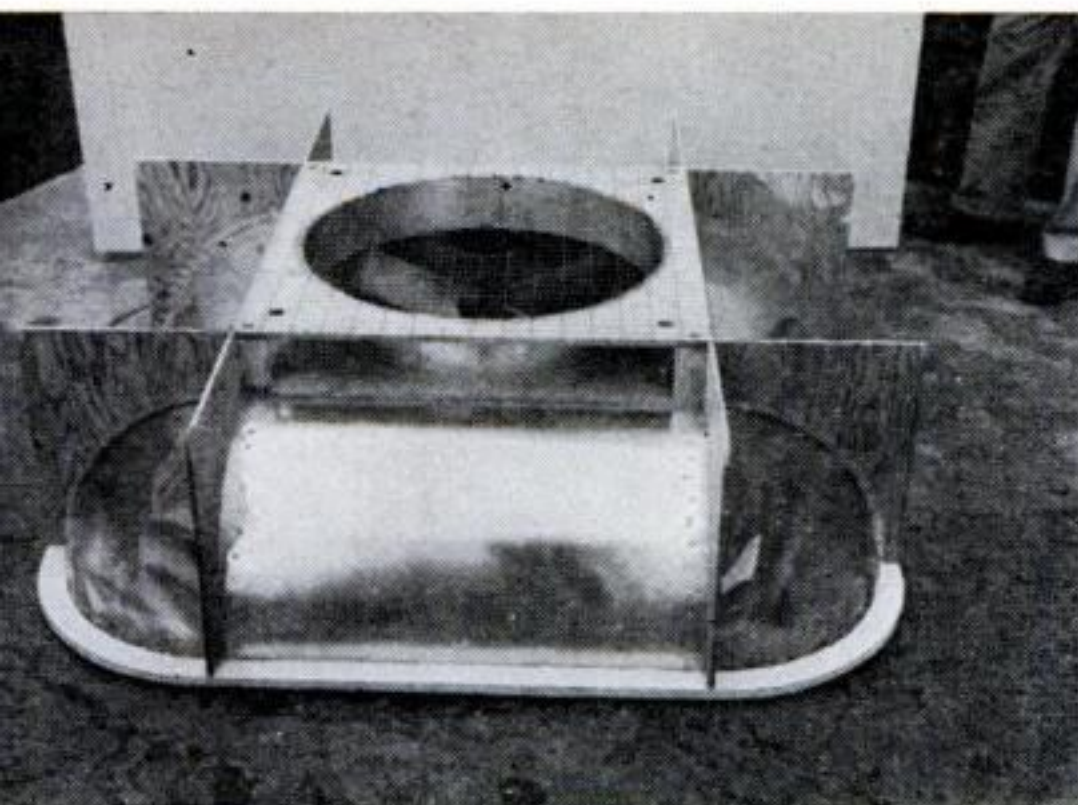
That's a 200-lb. load — four 50-lb. bags — entirely supported on a cushion of air.



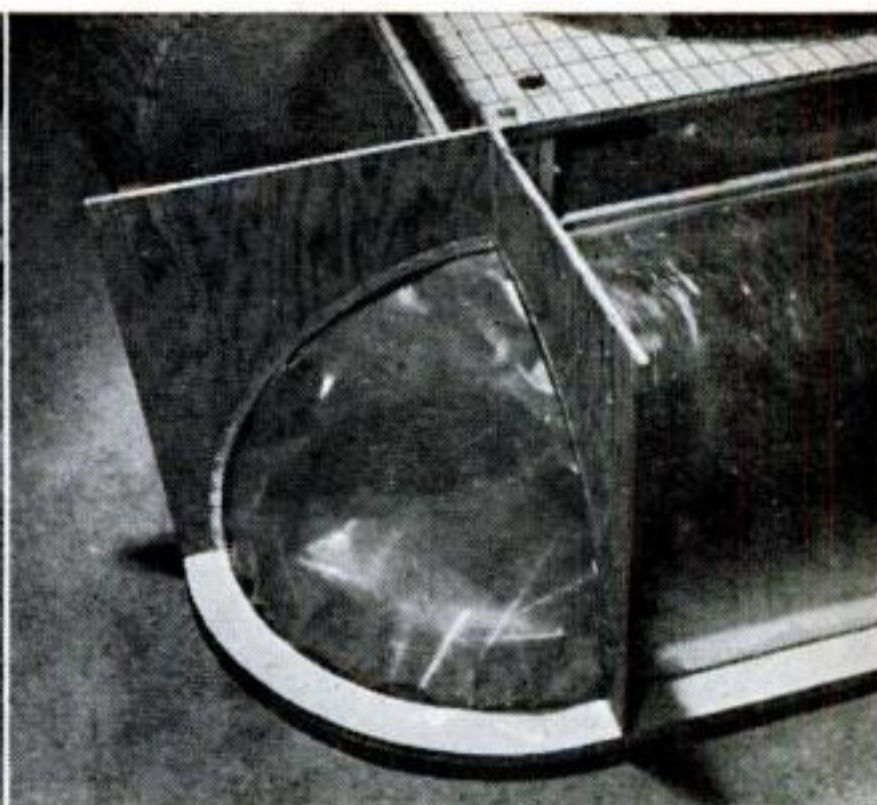




## Plywood, plastic, and aluminum make the airframe



**FINISHED "HULL"** showing how fan shroud and rounded contours in the plenum chamber are obtained, using sawed-to-shape plywood covered with a skin of sheet aluminum and plastic film.



**ALUMINUM IS FASTENED** to inner curve of struts by bending a flange over flat against the plywood, and securing with stapling gun. Aluminum is slit every 1 1/2" to make a smooth bend.

to follow. More—you can easily trundle a 100-lb. load across a soft, soggy lawn with this machine and never leave a mark.

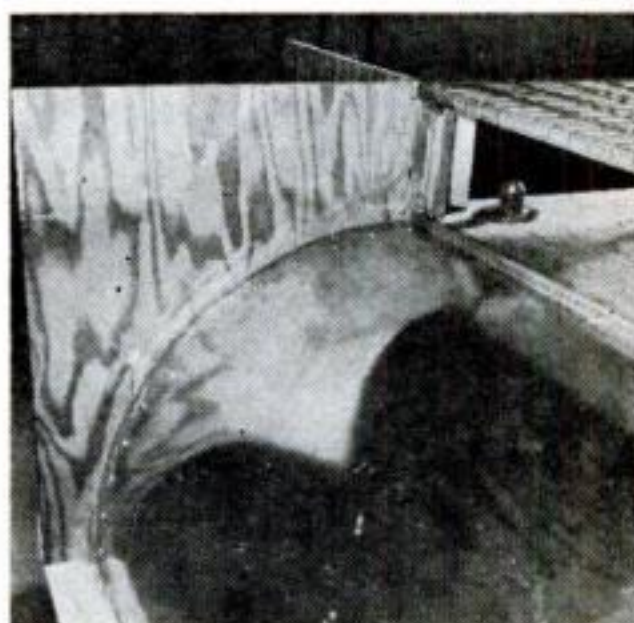
The Flying Cart is a true ground-effect machine (GEM). It has no wheels. It glides on a cushion of compressed air supplied by a modified chain-saw engine and a four-bladed wooden prop.

I built the "airframe" of ordinary lumberyard materials for \$59.75. If you're well supplied with plywood scraps you can cut that figure in half. Engine and props are from an outboard air-drive unit sold by Airboats, Inc. (3323 N. Florissant Ave., St. Louis 7). New, they cost \$130.

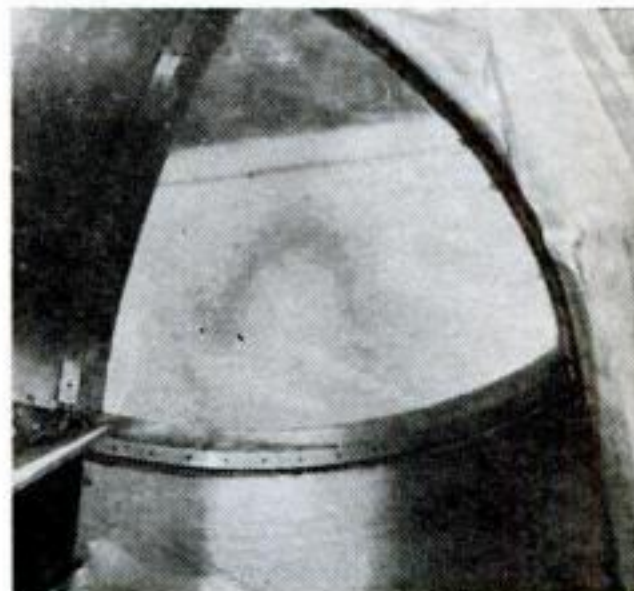
*How it got that way.* The cart didn't start out as a search for an improved wheelbarrow—it happened the other way around. The building itch came with the first story I read about air sleds, and intensified with each story thereafter. It was a challenge to build a totally new kind of vehicle before all the development problems were trampled to death—and all the unanswered questions were answered—by multimillion-dollar research programs.

I doodled the requirements. It would have to be:

- Reasonably easy to build with ordinary home-workshop tools.
- Adaptable to continuing changes and experi-



**CROSS-LAPPED STRUTS** are clamped between main frames, glued and screwed to the spacer block. Note floor flange that anchors leg of the platform covering engine.



**PLASTIC FILM** is folded double under the clamps. Sheet-metal screws hold the two aluminum clamping strips. Plywood clamp at bottom is held by wood screws.

### Write for fuller drawings

Want to build the Flying Cart? The drawing at left shows enough for you to proceed on your own. For larger scale drawings, send \$1 to: FLYING CART, Popular Science, 355 Lexington Ave., New York 17, N. Y.

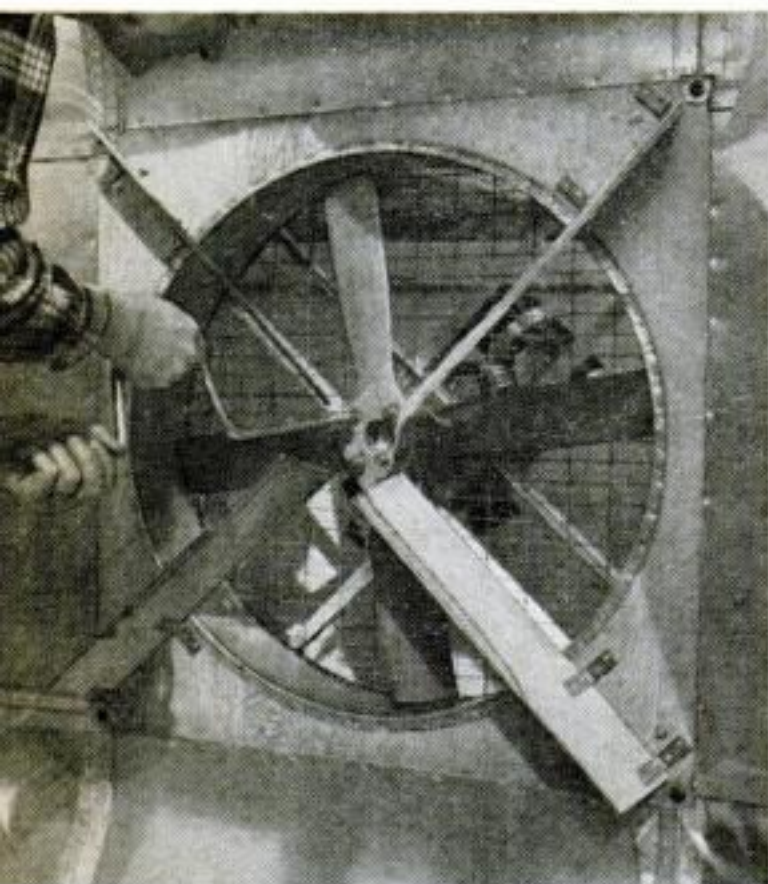


## Add the deck, motor mount, and prop

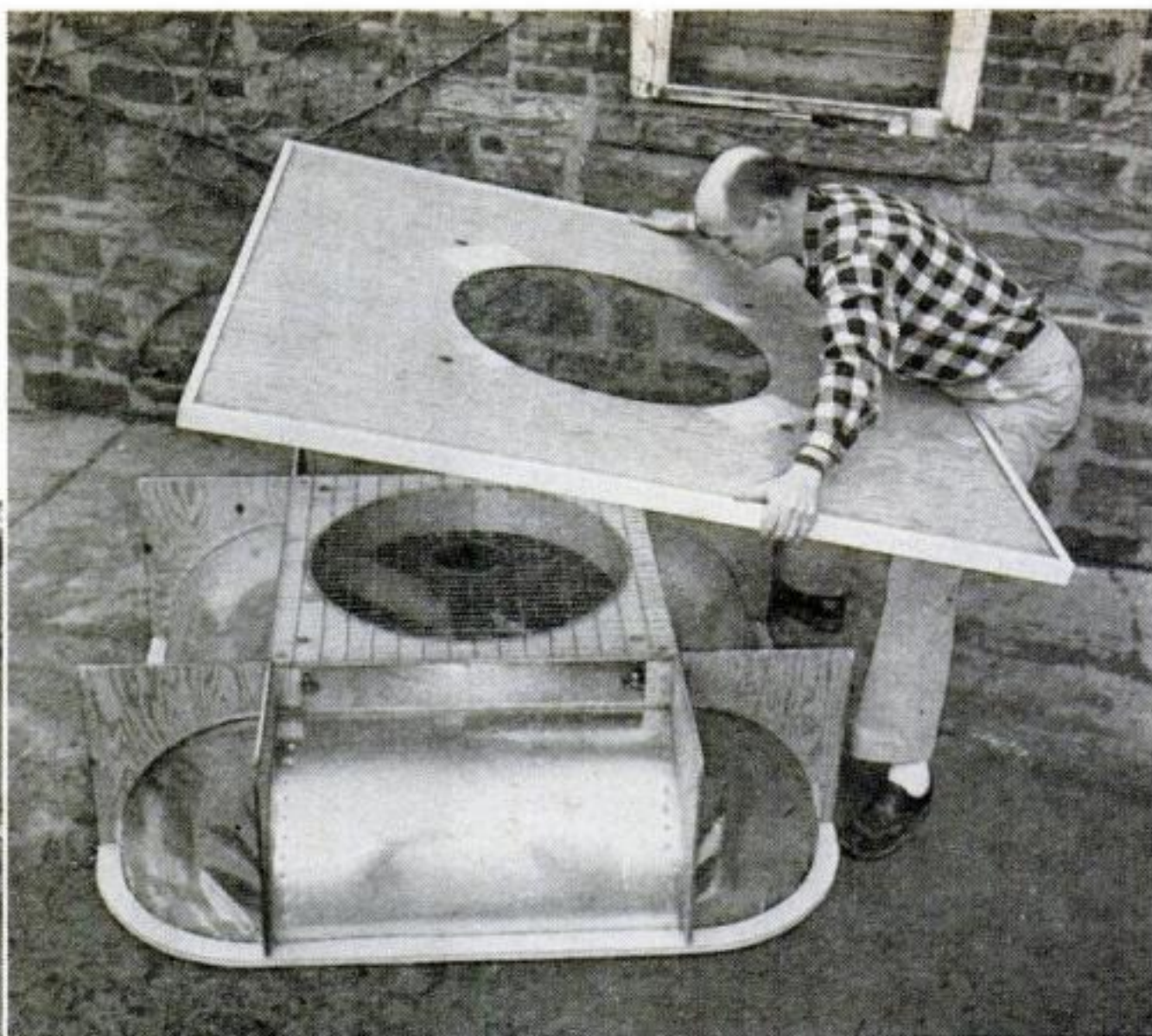
**DECK IS SEPARATE ASSEMBLY** held by bolts securing the motor mount. Side rails are notched to engage upper corners of the struts and rabbeted to receive  $\frac{1}{4}$ "-plywood deck cover. Wire-mesh blade guard is clamped between deck and hull.



**MOTOR MOUNT** is bolted through the deck and upper main frame. Hardwood blocks clamping ends of each pair of angles add rigidity to the mounting assembly.



**PROPELLER MUST BE BOLTED** to the hub after the engine is in place. Vanes were added after the first trials to counteract torque effect and improve the air flow.



mental modifications, yet functional in its most elementary form.

- Large enough to carry a practical load—not a toy.
- Small enough for one man to handle and not pose an awkward storage problem.
- Cheap enough for a modest budget.

All of these points apparently ruled out a riding vehicle. So when someone suggested an air barrow, it seemed like a happy choice.

**The one that didn't work.** Take one leftover sheet of plywood that happened to be 34" by 48"; nail one-by-fours to the edge to form an open box; cut a hole 24½" in diameter in the center of the plywood sheet, and you have the body of my first "feasibility-study" model. A ½-hp. electric motor driving a 24", three-bladed cast-aluminum exhaust-fan prop supplied the air. I wanted to see if the crudest possible rig would provide any encouragement to go ahead with the project. It almost didn't. When I switched it on, the shop filled with a wild roar and a dense cloud of dust, but there were no signs of levitation. The air stream was hitting the floor and bouncing right back through the fan blades.

I extended the sides to 16" to get the fan farther from the floor. This time it teetered on the brink of floating. Backwash through the fan was greatly reduced. I rigged up a crude equal-arm balance and found that the machine required

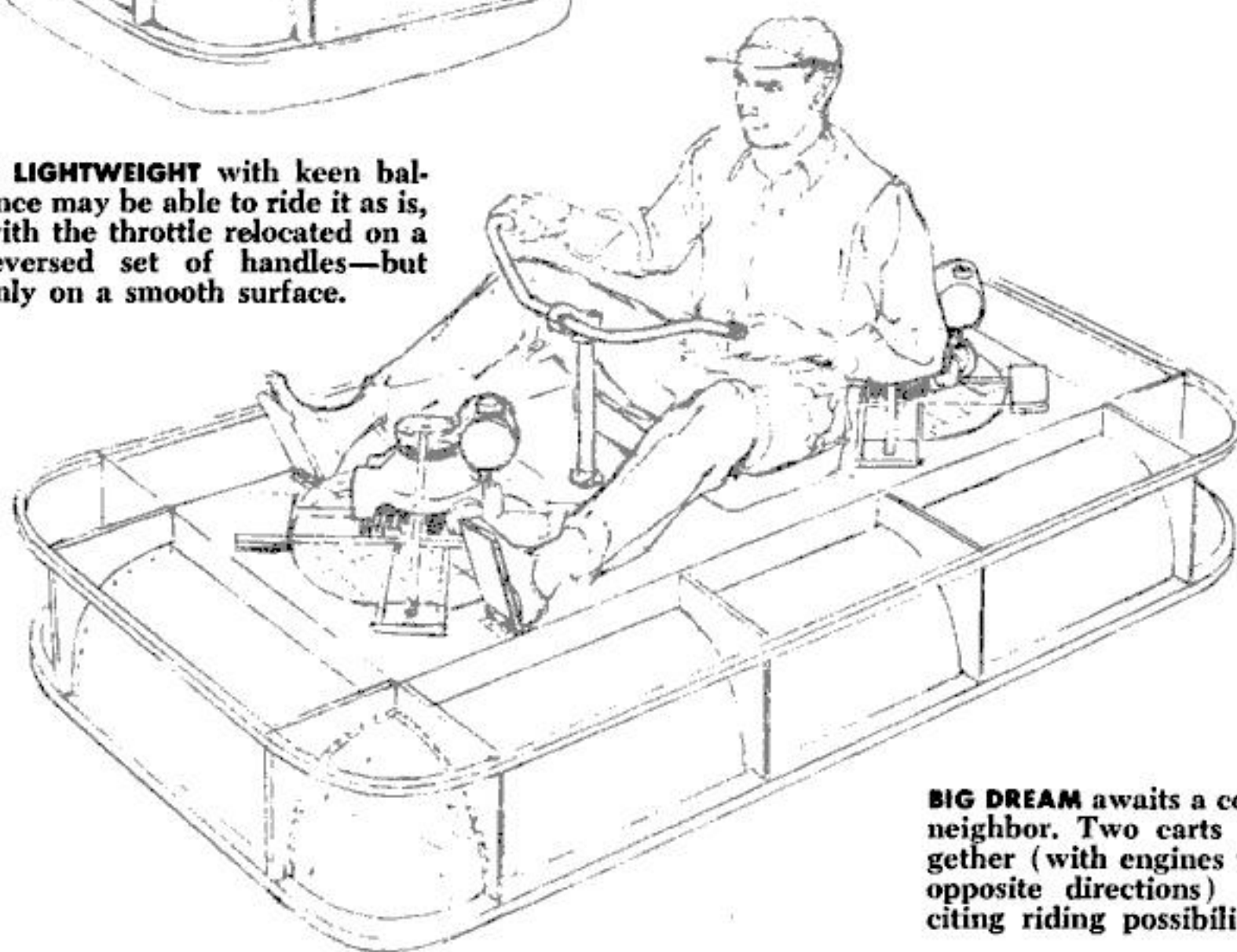
[Continued on page 226]



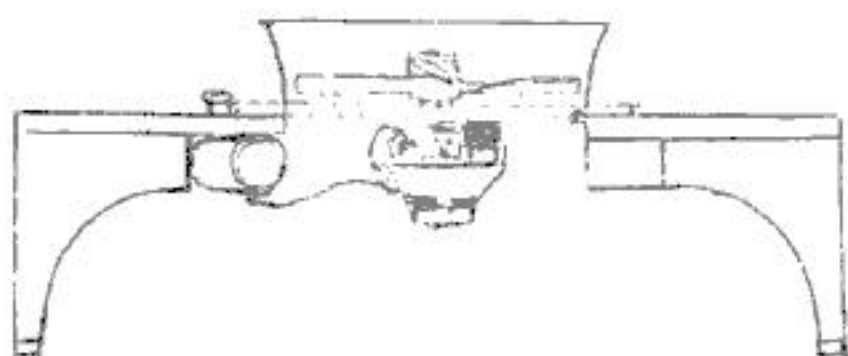
**Author's sketchbook  
shows future plans**



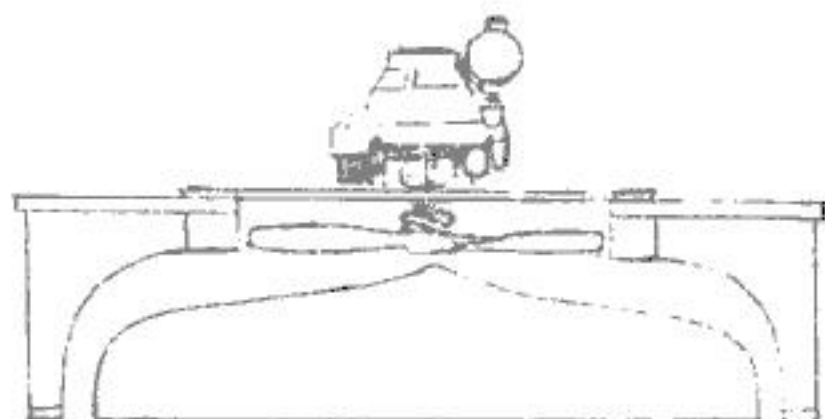
**A LIGHTWEIGHT** with keen balance may be able to ride it as is, with the throttle relocated on a reversed set of handles—but only on a smooth surface.



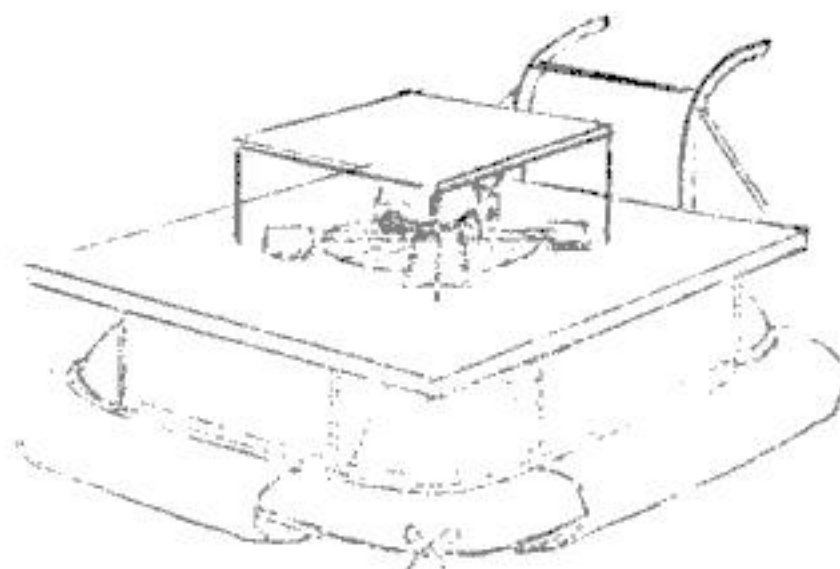
**BIG DREAM** awaits a cooperative neighbor. Two carts joined together (with engines turning in opposite directions) offers exciting riding possibilities.



**INVERTING THE ENGINE** would lower center of gravity and allow use of standard prop with an engine rotating in conventional direction.



**CONVERSION TO AN ANNULAR JET** will be easy. According to theory, it should ride higher off the ground. I'll try a flat plywood bottom first, then tackle the problem of making a properly shaped core like this.



**AN OVERSIZE SKIRT** with a drawstring in the bottom edge may improve stability and performance as an air barrow over rough terrain.

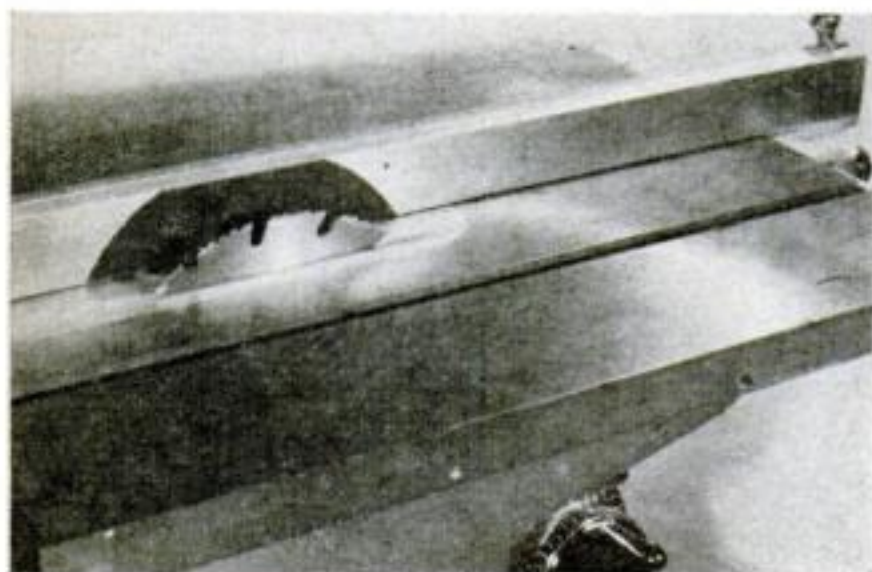


## Short Cuts and Tips

FROM PS READERS

### Try a Barbecue in a Wheelbarrow

PUT a metal wheelbarrow to work for cooking outdoors; you'll appreciate its mobility the first time rain sends you hustling for cover. A junk yard or appliance dealer can supply an old refrigerator shelf for a grill. Hold it in place with S hooks bent from heavy wire. If you're uneasy about damaging your barrow, you can build the fire on a layer of sand.—*James Bartlett, St. Petersburg, Fla.*



### Safety Mark on Saw Fence

WITH the area covered by the saw blade painted red, the zone of danger and the exact position of the blade will be known for blind cuts. Raise the blade to its highest position; trace the arc on the fence.—*R. Hanscom, Elmhurst, Ill.*

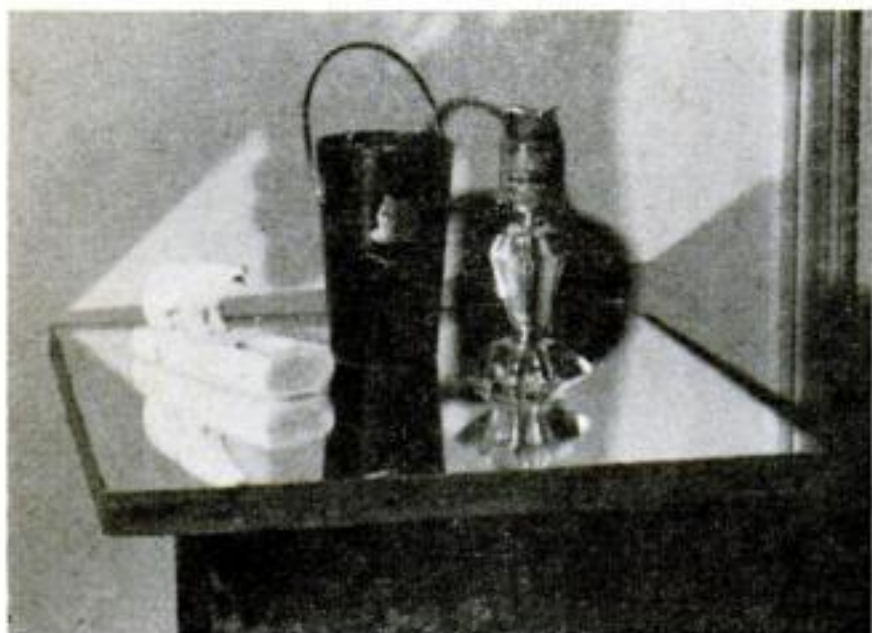


### Guide for Driving Brads

GETTING brads started is awkward and often rough on the fingers. I overcome this by sticking them through a folded strip of paper. It holds the brad in position until started. Then I just pull the paper out.—*Bil Toman, Palatine, Ill.*

### Glass Makes New Table Top

A SERVICEABLE new top for a small telephone or bedside table can be made from glass, including even discarded mirrors. Cut the glass to size. Lay it over a matching piece of  $\frac{3}{4}$ " plywood. Then cover wood and glass edges with veneer strip. This inexpensive material has an attractive wood grain, and can be toned with stain and wax to match the table. Any good glue will give a tight bond, but a special cement is available.—*Carlton G. Bucher, White Plains, N. Y.*





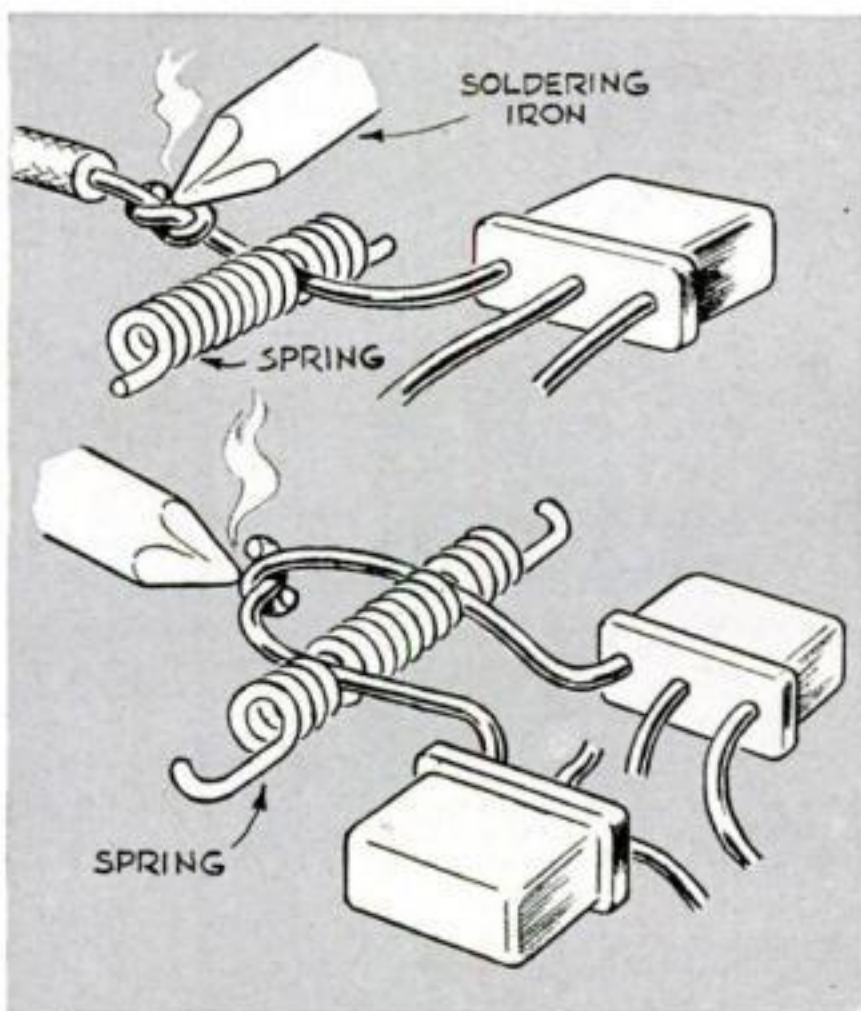
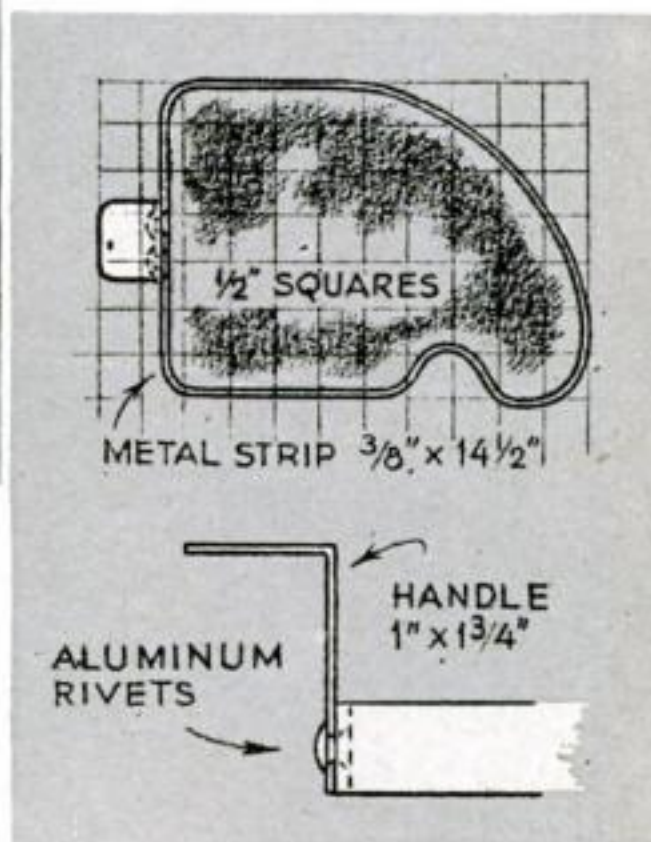


### Mold for Hamburger Steaklets

AT YOUR next party or outdoor barbecue, your hamburgers will make an even bigger hit if you serve them shaped like little T-bone steaks. Make the mold from  $\frac{1}{16}$ " aluminum, as at right, joining the ends of the strip by riveting them to the L-shaped handle.—Robert Micals, Freehold, N. J.

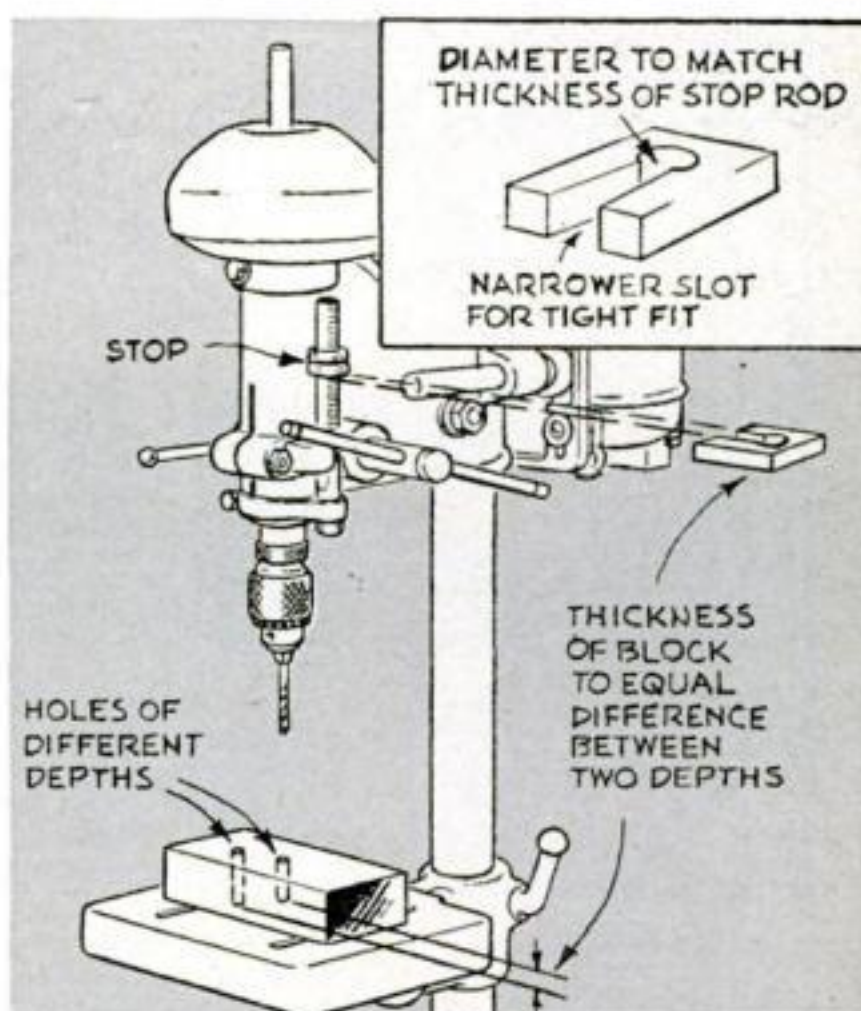
## Short Cuts and Tips

FROM PS READERS



### How to Solder Transistors

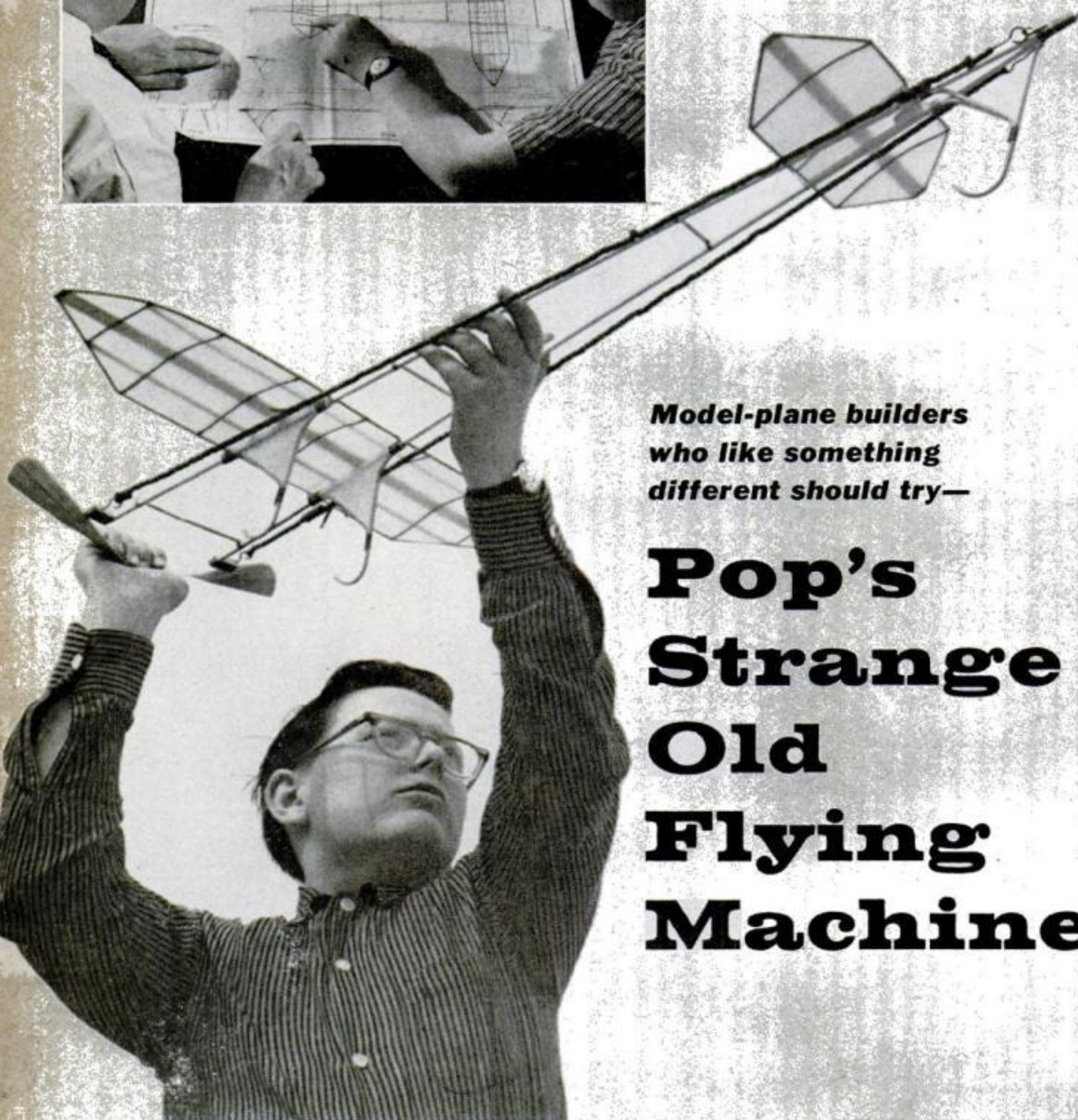
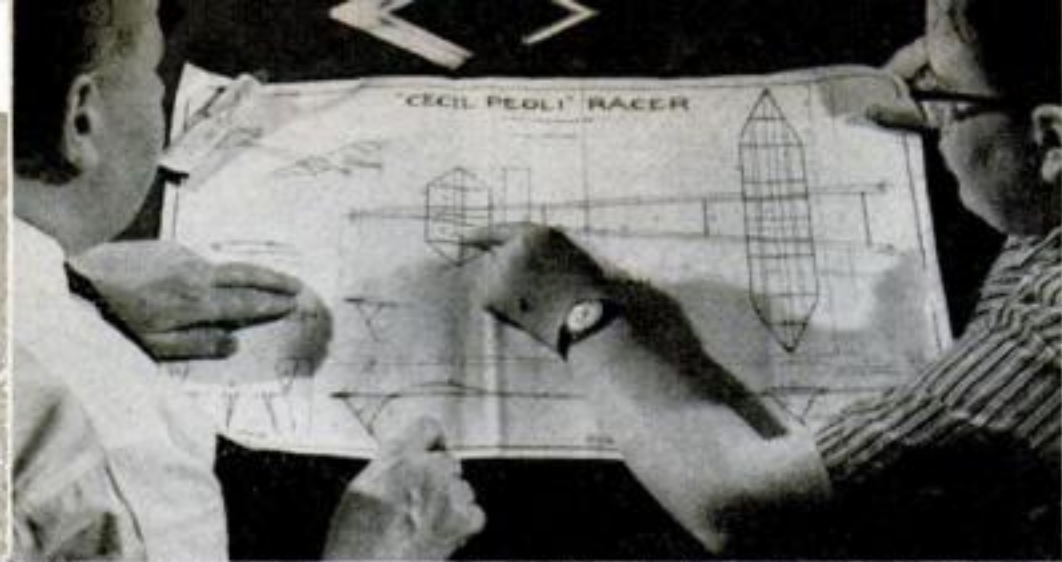
THE problem when soldering transistors into a circuit is that heat may damage them. Pliers will serve as a heat sink, but they leave only one hand for the work. I clamp the lead in a small spring; thus the heat is dissipated by the coils before it can reach the transistor. The spring also functions as a miniature vise when you solder two transistors together.—D. Van Gilder, Denver, Colo.



### Intermediate Stop for Drill

BORING holes or mortising to two different depths in a series of pieces on the drill press usually involves tedious re-setting of the stop gauge. Here's a tip: Set the gauge for the deeper drilling. Drill. Now beneath the stop slip a block the thickness of the difference between drill depths. With the shallower hole bored, remove block for the next piece.—John F. Marshall, Newburyport, Mass.





***Model-plane builders  
who like something  
different should try—***

# **Pop's Strange Old Flying Machine**

**By Harry Walton**

**A**FELLOW showed up at a model-plane meet last fall with a strange, rubber-powered contraption. It had twin props at the rear, flew with elevator in front. Most of the onlookers had never seen such a thing—an old-time twin pusher. It stole the show.

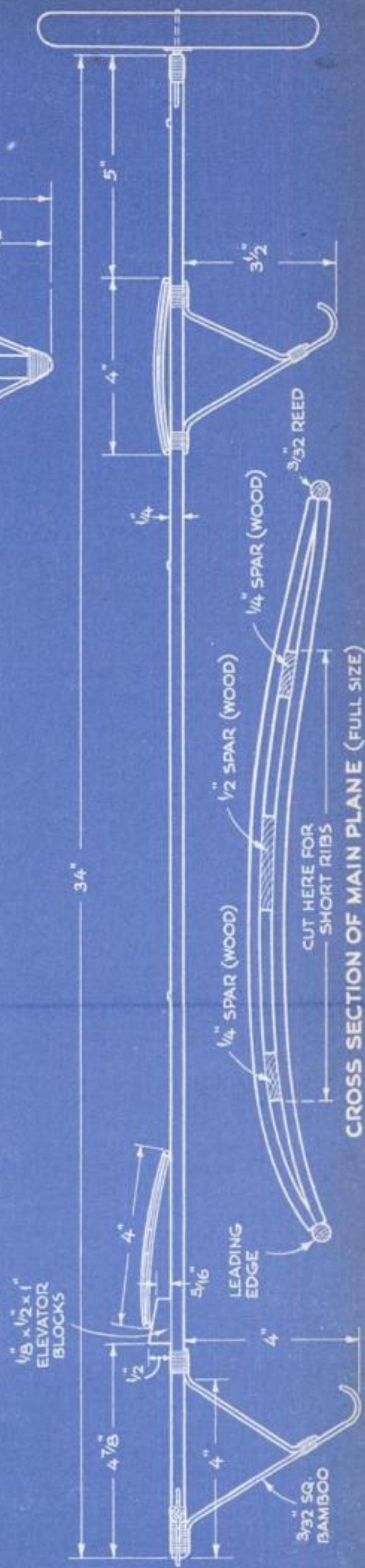
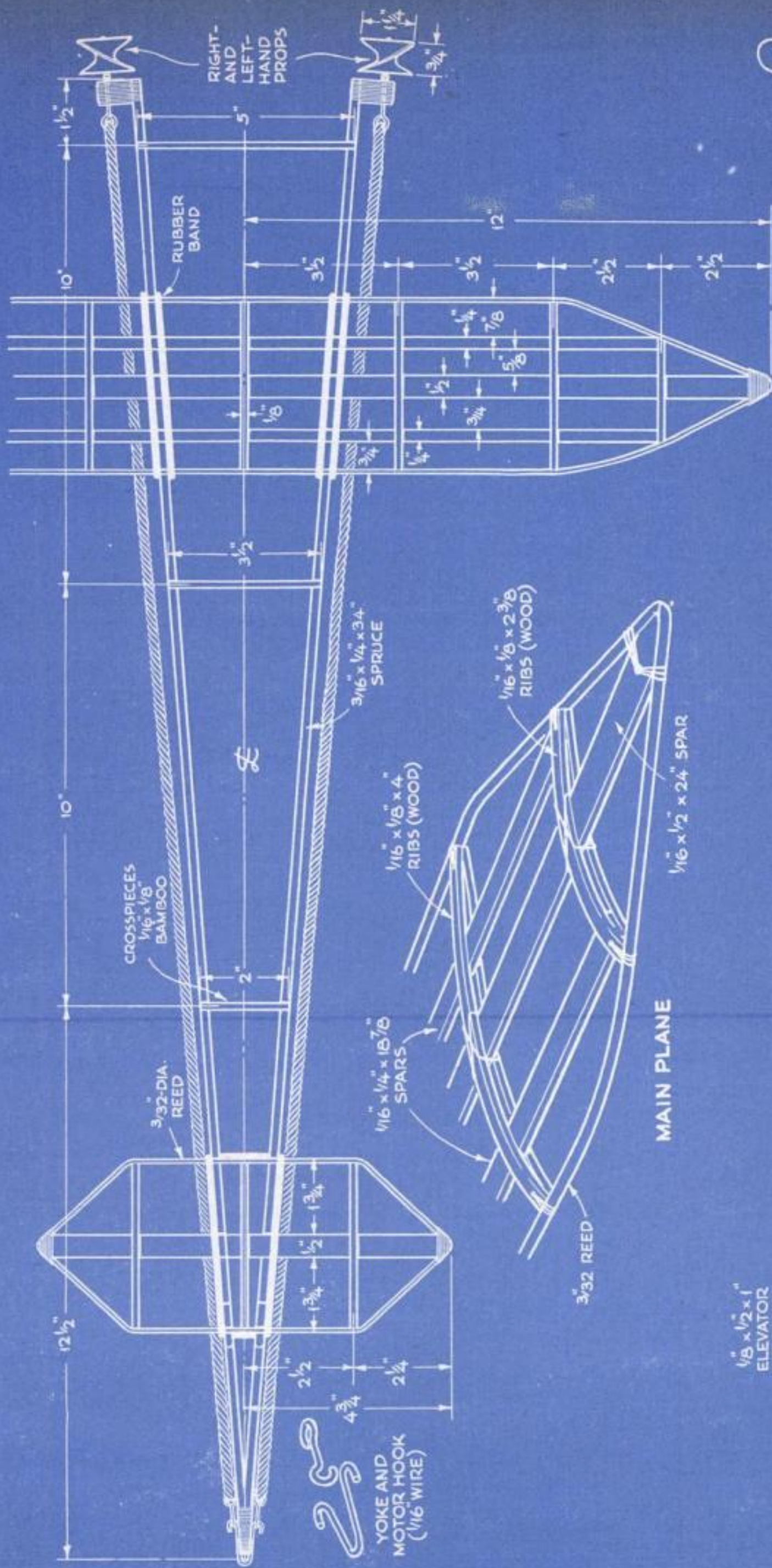
The incident made me wonder. Why *should* we let those old flying machines be forgotten? They flew well half a cen-

tury ago—and would if built again.

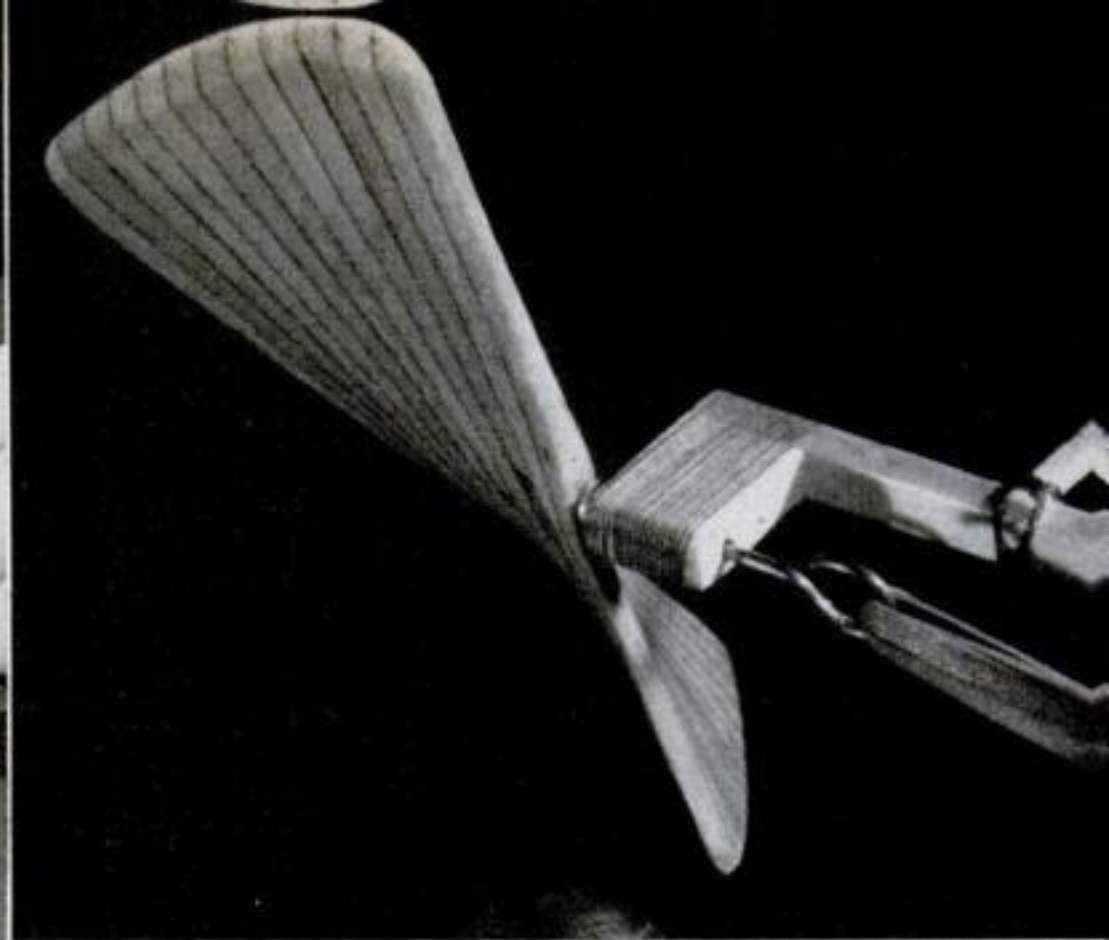
Early modelers tried fancy gearboxes to wring all possible action out of their rubber-strand motors. But nothing beat a long fuselage carrying yards of elastic. So they whomped up some weird flying machines to achieve this.

Wings were straight; nobody had invented dihedral yet. Twin props could be used to eliminate torque, but balsa was unknown to modelers, who used spruce, pine, and bamboo. Models were



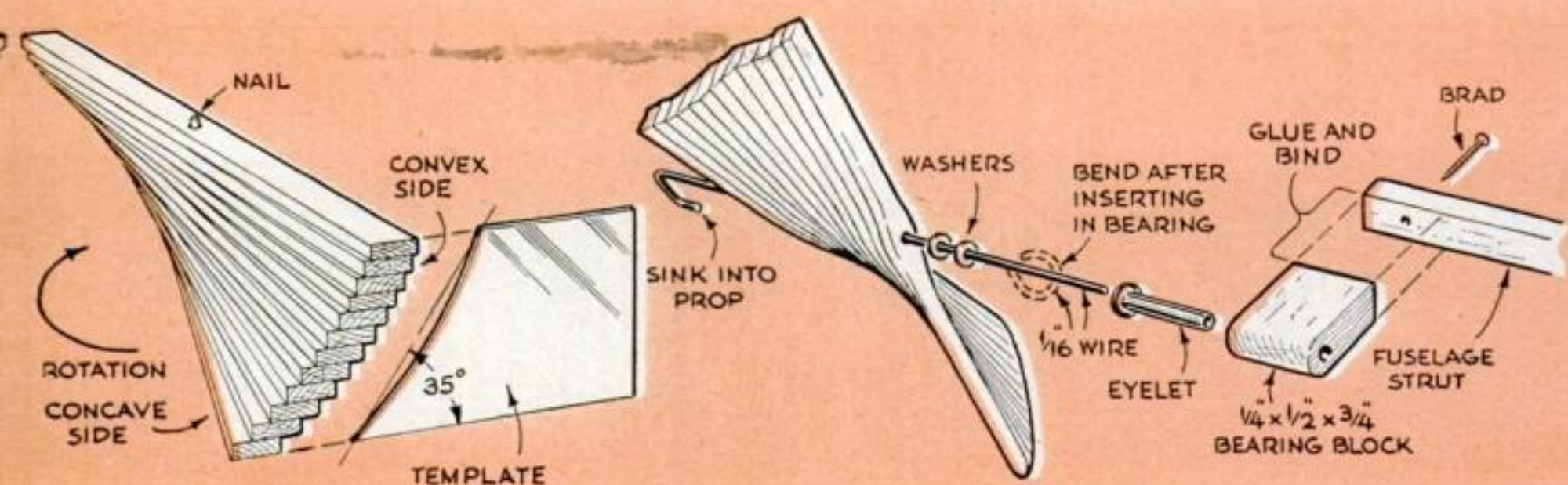






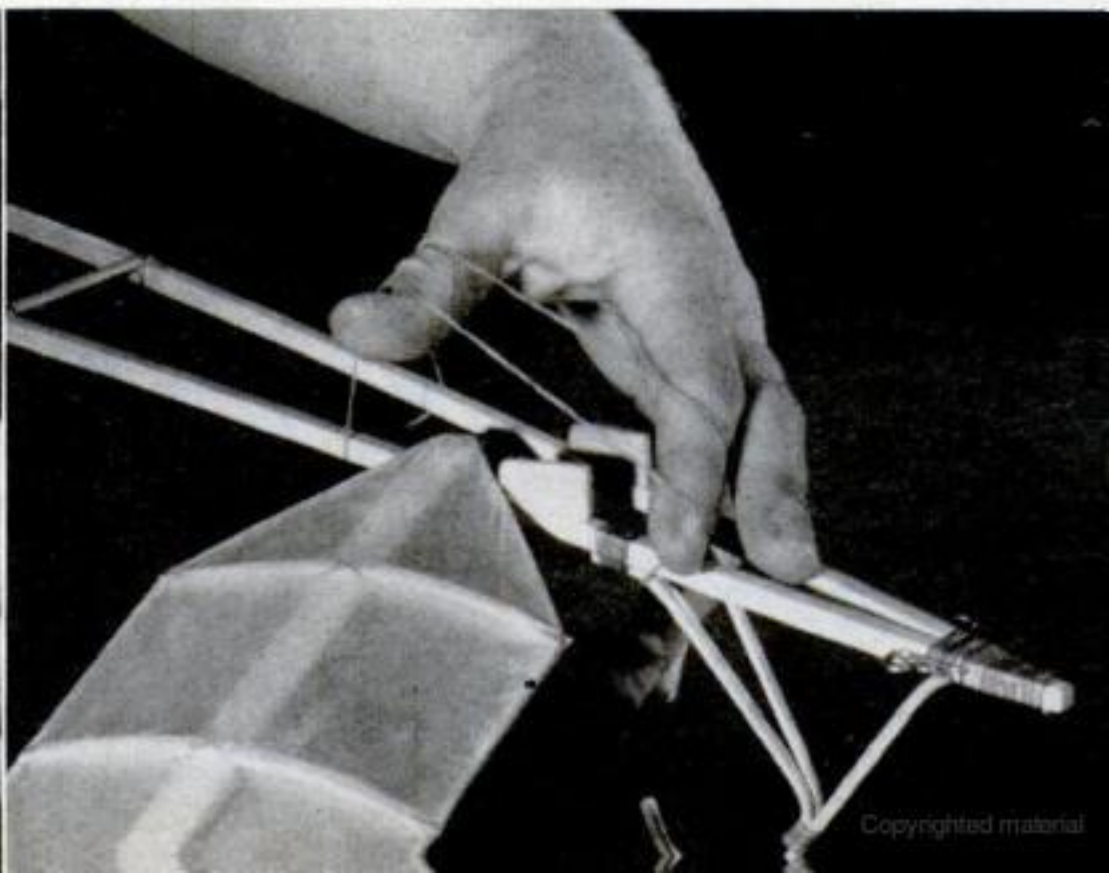
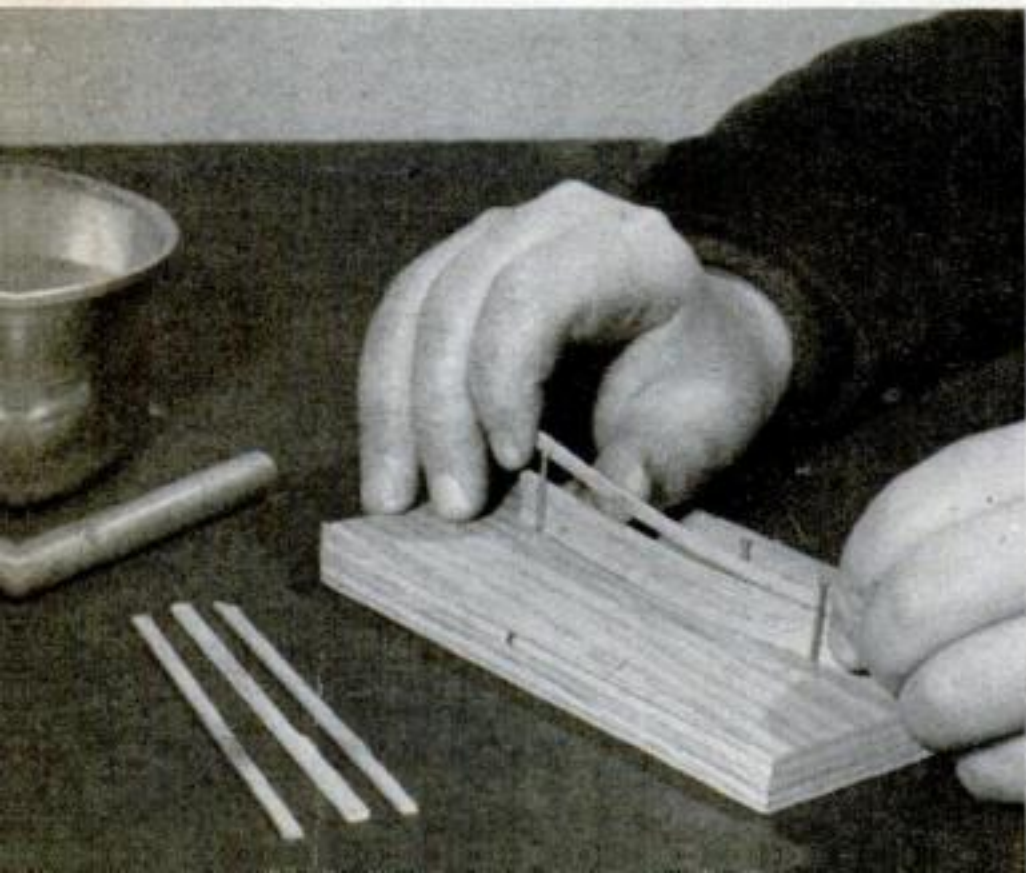
**FOR THE PROPS**, drill center holes in  $5/16$ "-by- $6-5/8$ " strips of  $1/16$ " hard balsa. Coat both sides of each piece with slow-drying glue. Stack them 1" high on a nail, twisting the stack to an angle of 35 degrees at the ends. Check with a template as shown. For the second prop, be

sure to stack the strips in the opposite direction. The bearing blocks are wood, bushed with eyelets. Shaft hooks must be formed after shafts are in the bearings. Attach the bearing blocks to the fuselage sticks with glue, one brad each, and a binding of strong thread.



**BOIL RIB STOCK** and spring each piece, using a jig made of three nails, to the airfoil shape shown in the drawing. Be sure to assemble ribs square to the wing spar and all facing the same

way. Hold both main plane and elevator on the fuselage with rubber bands as below, sliding the planes into position. Set the front edge of the elevator on the tapered blocks.





heavy, had to be hand-launched, flew strictly on prop power, and landed fast—but set some sizzling records.

One famous twin pusher designed by Cecil Peoli flew a record third of a mile at 22 m.p.h. way back in 1911. Though later pushers hit 40 and 50 m.p.h., Peoli's was such a good flying machine that it was still a popular model in the Twenties. That's when I built it from a kit.

**Parts weren't precut** in those days. I had to boil, bend, and even sew pieces together. Wound and straining to go, that gawky machine was an exciting handful. Let go, it streaked off at a terrific clip. Why not, I suggested to Roy Clough, an active modeler today, build that old champion again?

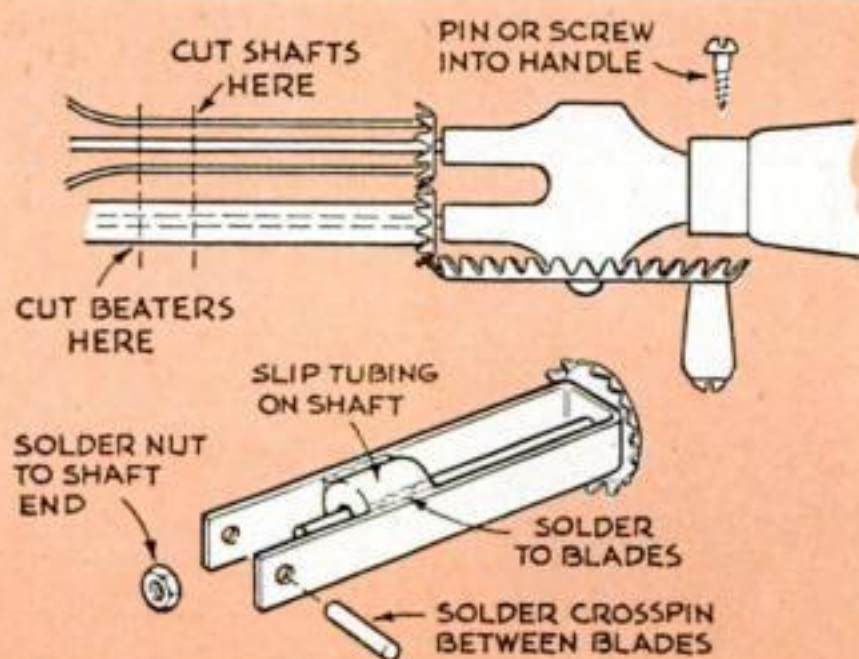
With plans borrowed from the manufacturer of the original kit, Clough went to work. The props were a problem, for they had to turn in opposite directions,

by its bearing block to each motor stick, using glue, a single brad, and a seizing of strong thread.

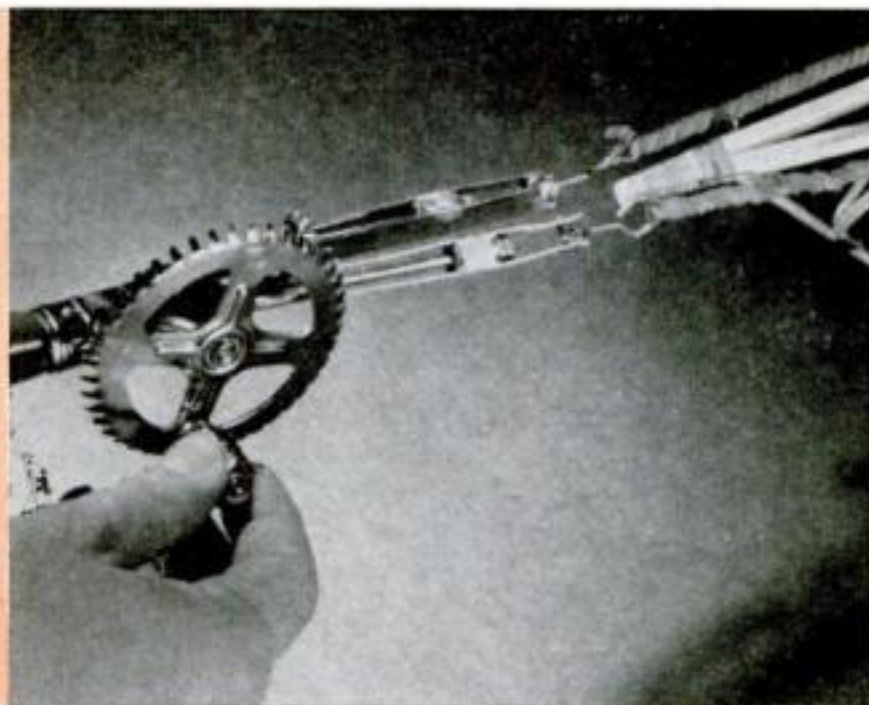
Bevel the opposite face of the other end of each stick to join them at the pointed end of the fuselage. Shape the double-eyed motor yoke to fit over this end and bind it fast. Three 1/16"-by-1/8" bamboo cross braces complete the A-shaped fuselage.

Split bamboo off a pole that will yield the desired thickness after the pithy inner layer is scraped off. For paired parts such as the rear skids, split off double-width pieces. Make the bends and split the bent parts in half.

Hold the bamboo near a candle or alcohol-lamp flame, the shiny side away from it. As the fibers soften, bend the piece inward toward the pith side. Hold in shape until it cools. (Very dry bamboo may bend more readily if moistened.)



**CONVERT AN EGG BEATER** to make a double winder like this. Pin or screw the handle on its ferrule to sustain the pull. With props turning



inward at the top, either turn the handle of this outside-gear winder backward, or hold plane upside down, turning the handle forward.

and we couldn't buy right- and left-hand ones of the right size. Clough solved that by gluing them up of strips—with no hand carving.

Make yours by stacking 5/16"-wide balsa strips, staggered at a 35-degree angle. Stagger the second prop at the opposite angle. After the glue has set hard, sand the steps away, shaping one side slightly concave, the other convex.

Mount the shafts in these props with the motor hook on the convex side. The original props turned inward at the top, but either way will do as long as you wind them accordingly. Fasten one prop

The single front strut has two braces, one to each fuselage stick. Mount the rear skids and their braces at equal outward angles, with the cross brace in the crotches.

**Wing ribs.** Cut them 4" long from 1/16"-by-1/8" spruce. Boil half an hour and clip them into nail jigs. Let dry overnight. For the short ribs of the main plane, trim long ones at both ends.

Shape the ends of the 1/2" spars to a point at the ends. Drill (or burn with a hot nail) a tiny hole 1/8" from each end of every rib and spar.

[Continued on page 221]

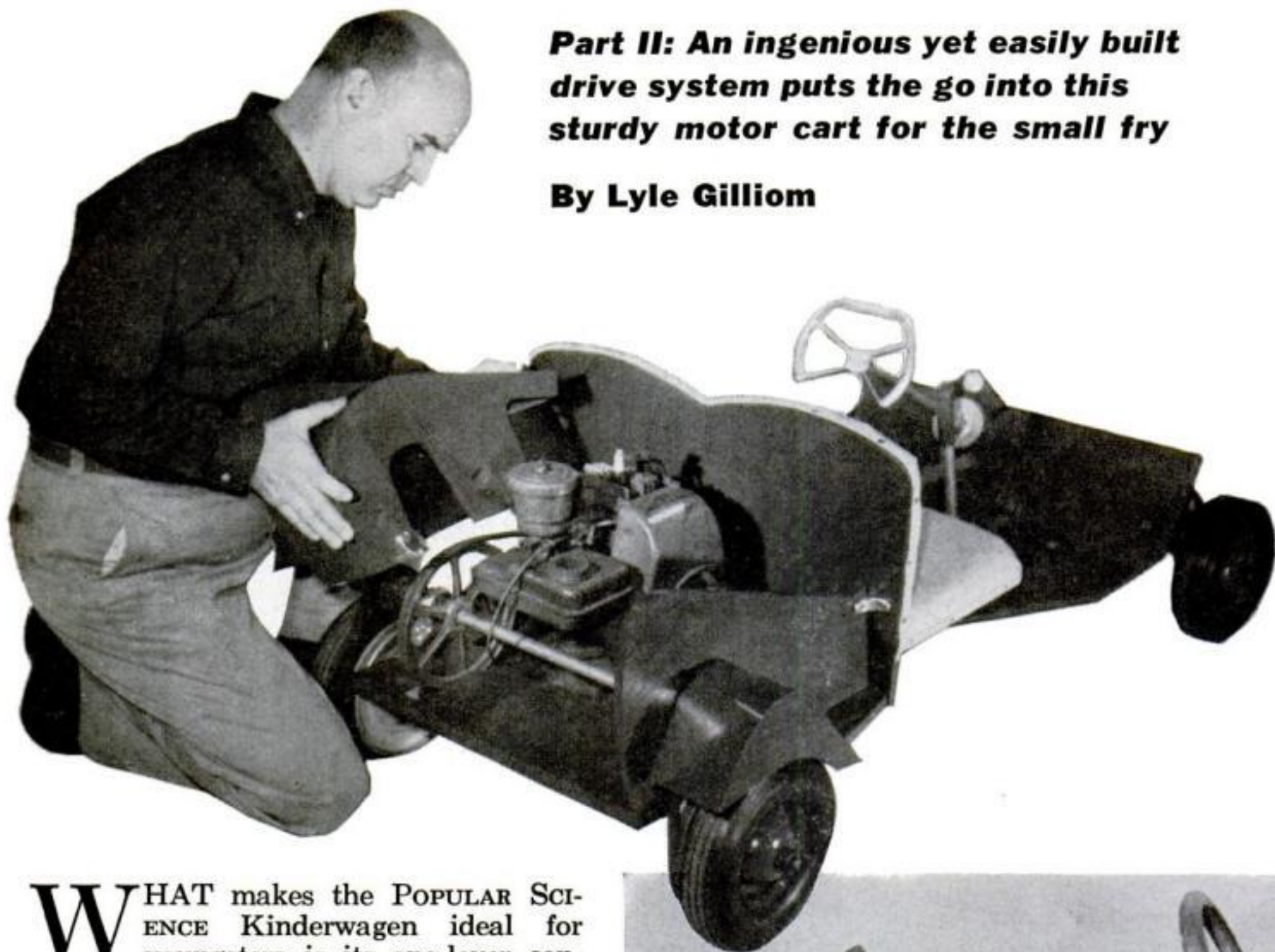




# How to Power the PS Kinderwagen

**Part II: An ingenious yet easily built drive system puts the go into this sturdy motor cart for the small fry**

**By Lyle Gilliom**

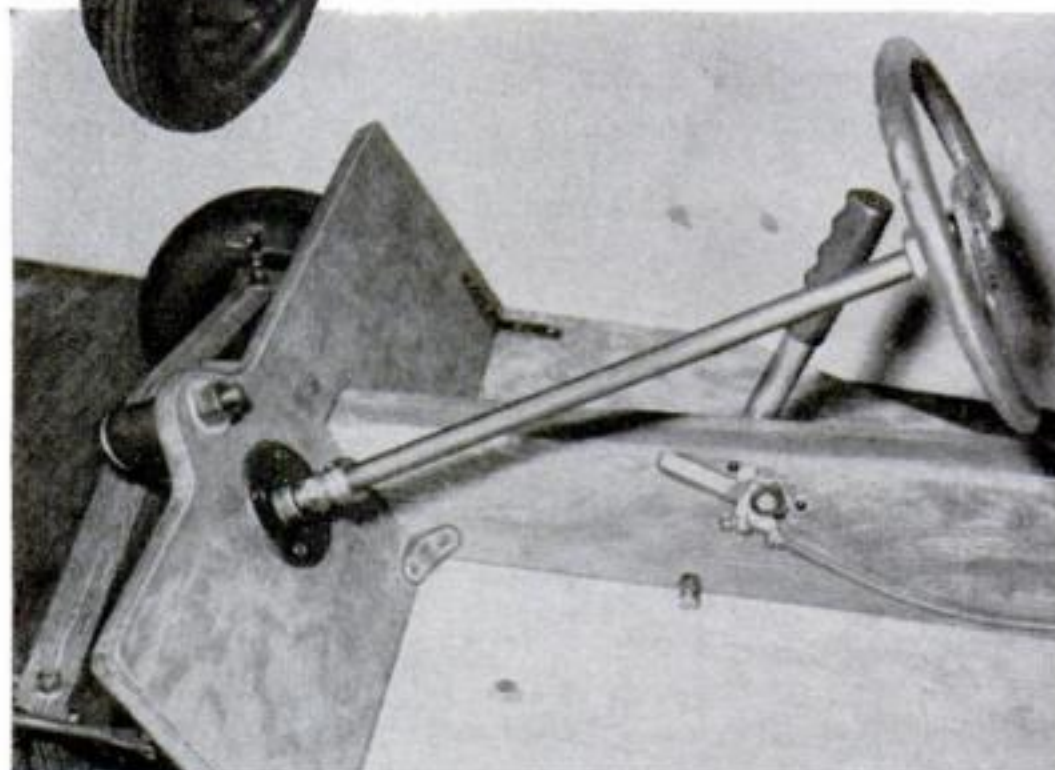


**W**HAT makes the POPULAR SCIENCE Kinderwagen ideal for youngsters is its one-lever control. Pushed forward, it latches into drive position; the cart takes off smoothly and keeps going. Pulled back, the control lowers the reverse-spinning friction drums, braking both wheels.

To back up, the same lever is pulled back and held. The drums move the car smoothly in reverse, but at low speed and only so long as the control lever is held. When released, it returns to neutral.

Tricky and ingenious? Yes. Hard to build? Not at all. The power train—standard shafting and pulleys—is made by sawing, drilling, and filing. The drive is by V belts.

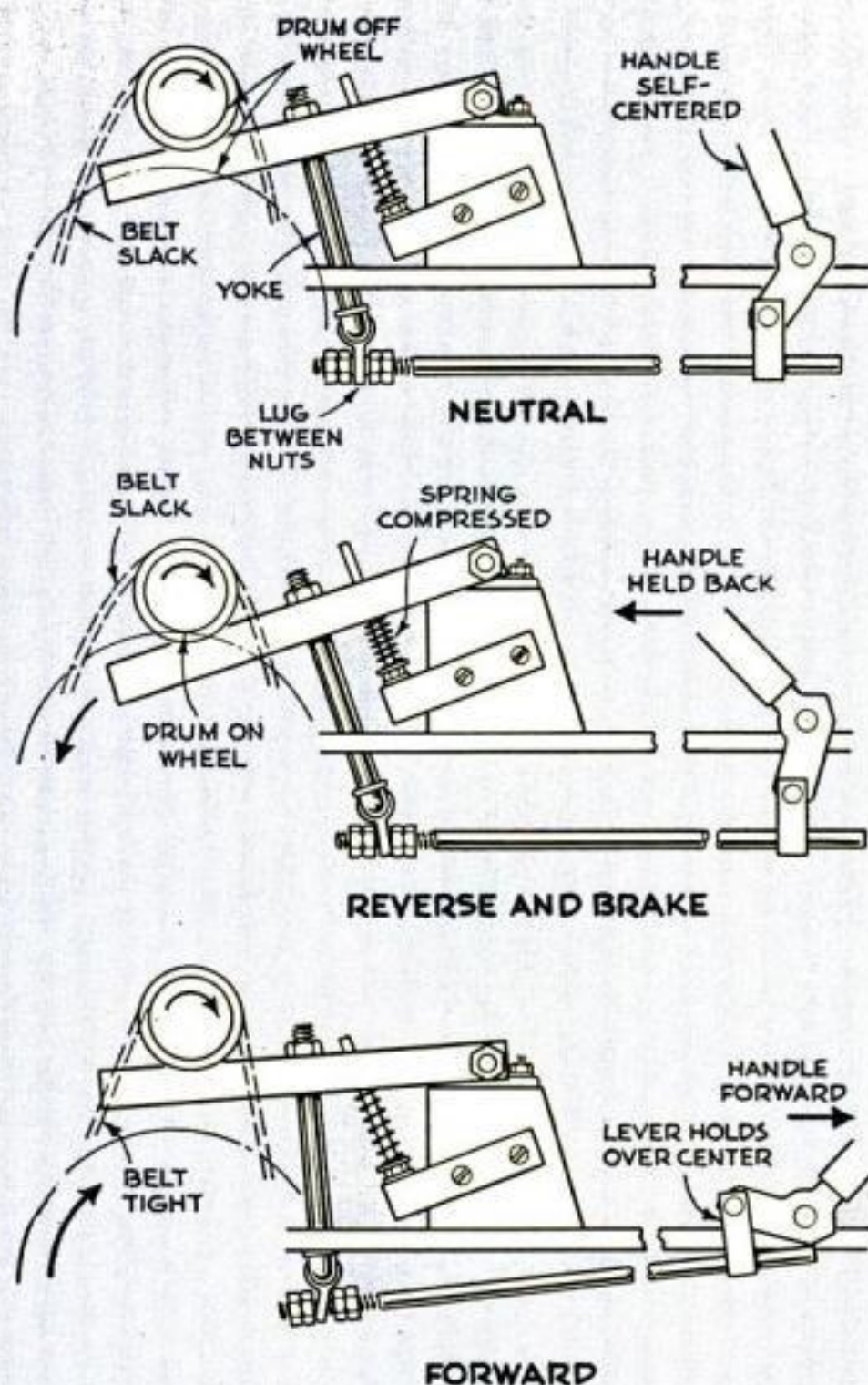
You are ready to undertake this part of the job after winding up the construc-



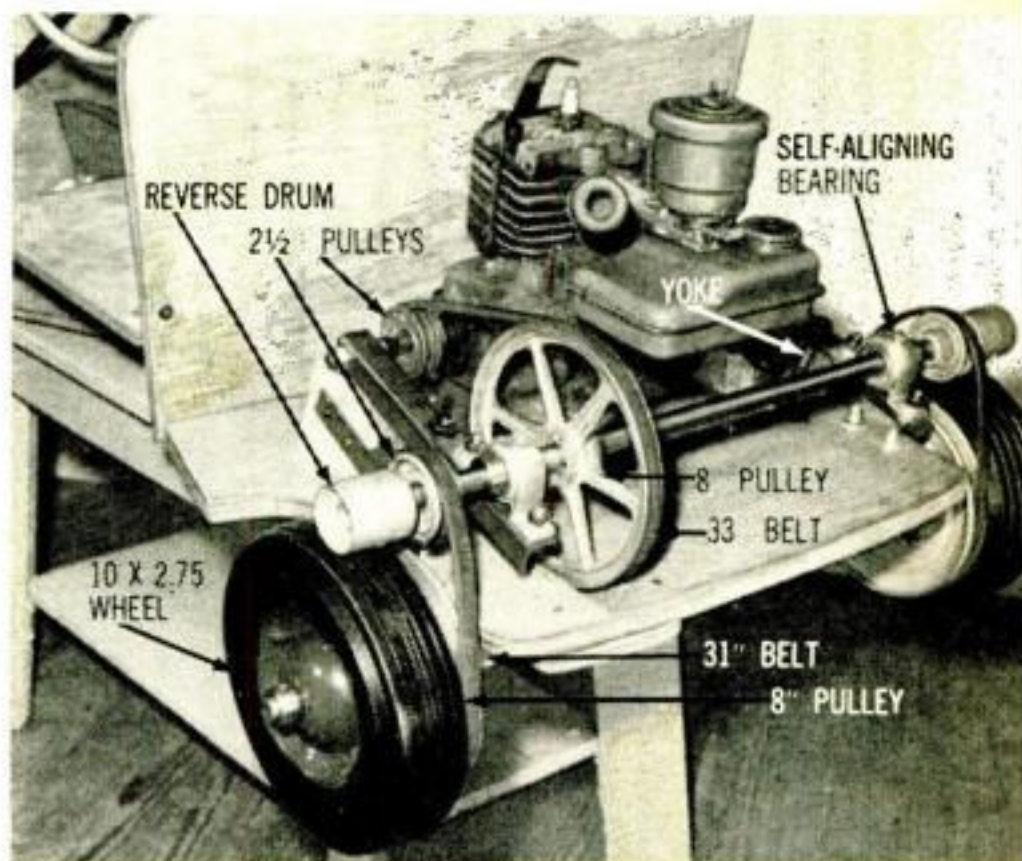
**LEFT-HAND DRIVE** puts the control lever on right side of the chassis beam, the control shaft running through the beam and bolted to the floorboard at each end. Throttle is fastened to beam; its cable runs under the seat.



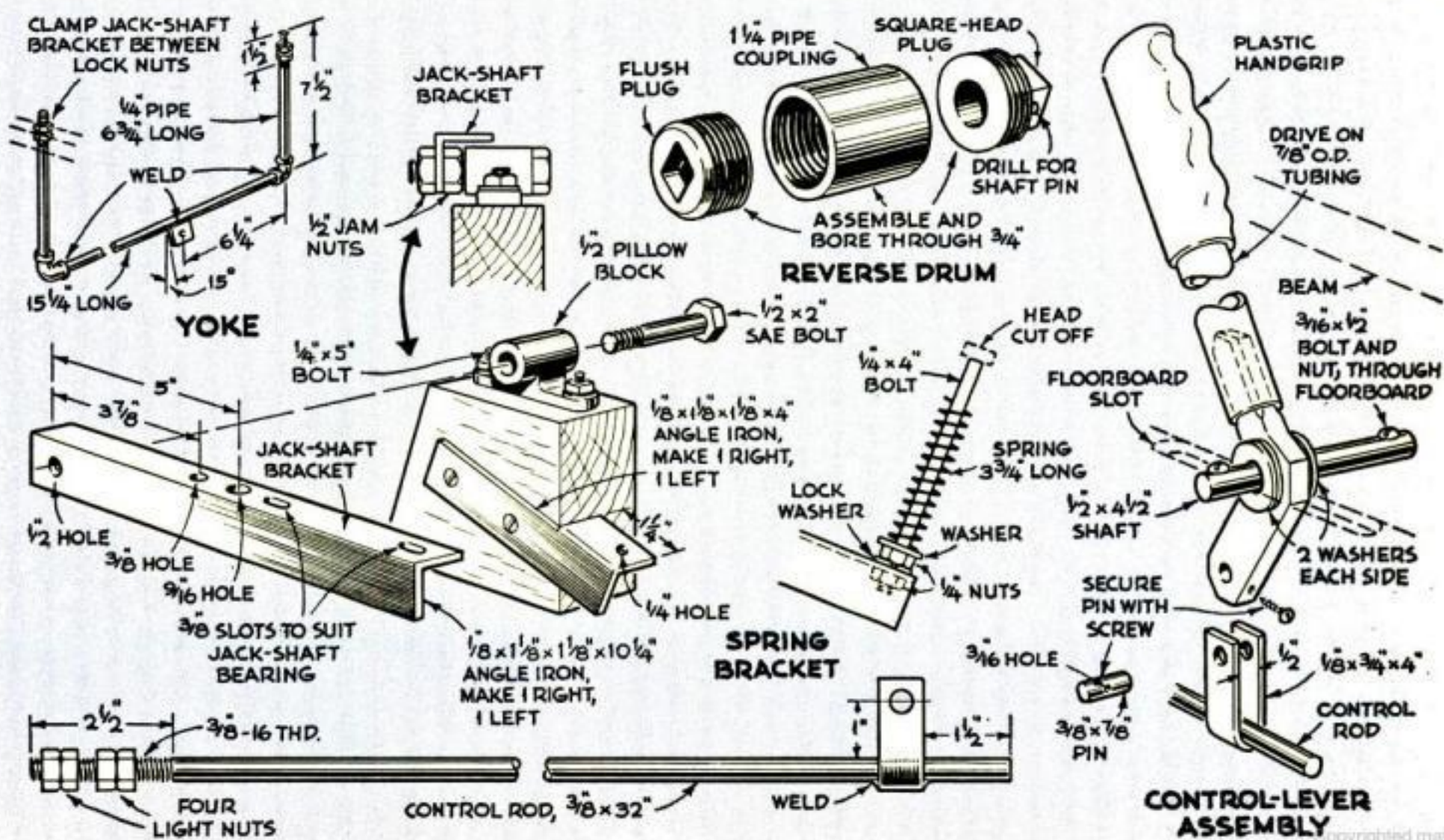
## Here's how the controls work



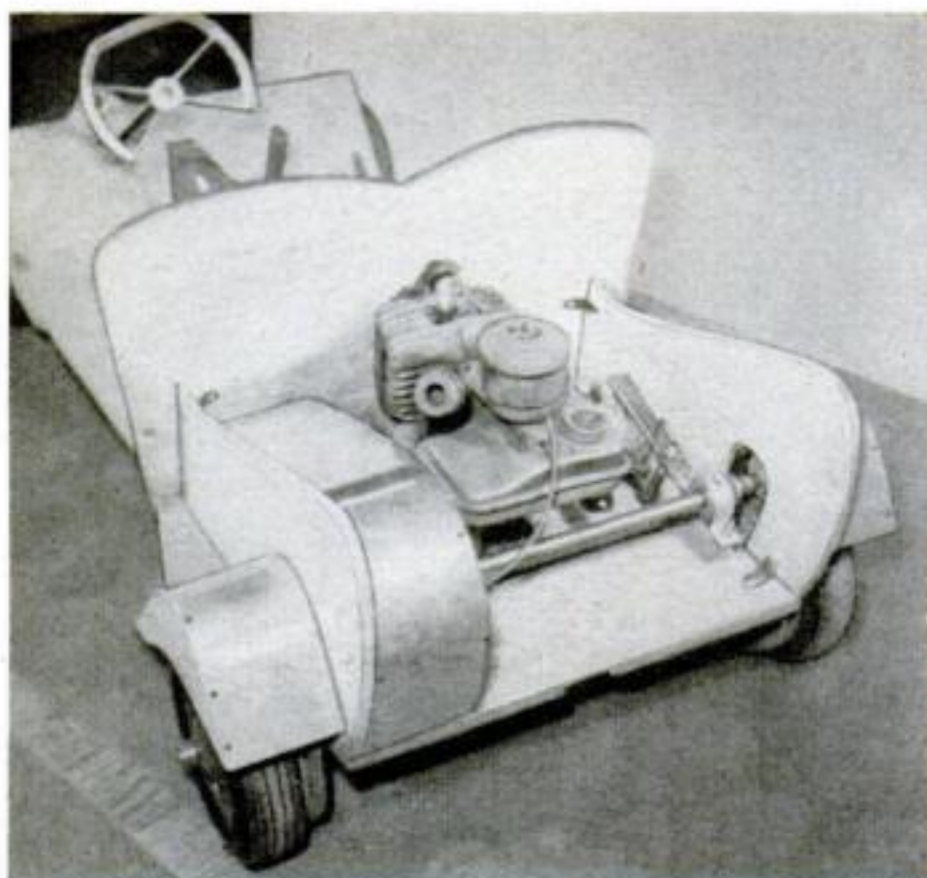
**JACKSHAFT BRACKETS** pivot in pillow blocks and are held up by springs to keep the reverse pulleys off the tires. The yoke should be fastened rigidly to the brackets with double nuts.



**POWER DECK**, with a typical four-cycle engine in place, looks like this before the fins are mounted. These go outside the jackshaft brackets. Note alignment of the engine shaft with the jackshaft-bracket pivot bolts.







**MOUNT TAIL FINS** with corner brackets to the seat back and engine deck. Make a plywood cage for the jackshaft pulley, covering it with

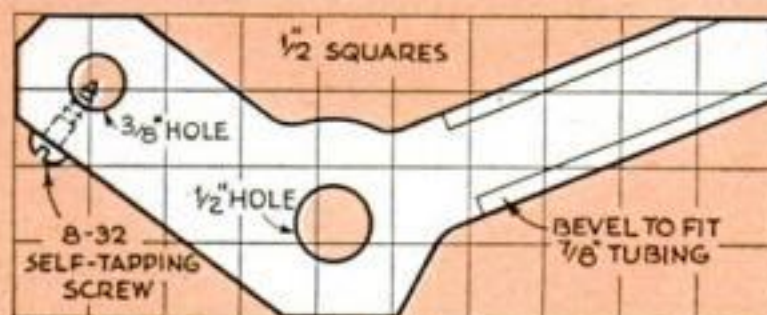
tion of the body as described last month.

**Drive pulleys** for the rear wheels should be the hubless kind with a big center hole. Lay out four  $\frac{1}{4}$ " holes 90 degrees apart on the flat area of the wheel web. Center a pulley as accurately as you can on the wheel, clamp it so, and drill through the web holes into the pulley. Be sure to mark each wheel and pulley so that you can assemble them in the same position as when drilled.

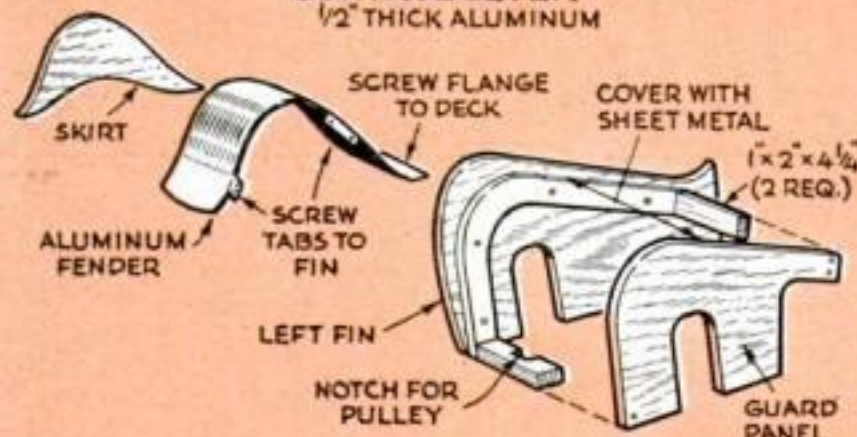
Saw short spacers from  $\frac{1}{4}$ " pipe to a length that will hold the pulley rim  $\frac{1}{16}$ " away from the tire. Assemble with  $\frac{1}{4}$ "-by-2 $\frac{1}{2}$ " machine bolts, lock washers, and nuts pulled up finger-tight. Then mount a wheel on the axle (or similar stock held in the vise) and spin it to determine where the pulley runs out of true. Tap the pulley on that side, continue testing, and when it runs dead true tighten the nuts hard. Mount both rear wheels with shaft collars.

**Jackshaft mechanism.** Being belted to the engine, the jackshaft must pivot on the center line of the engine shaft in order to maintain pulley spacing and so keep drive-belt tension uniform as it swings. Check the height of your engine shaft, and if necessary make the wooden spring blocks higher or lower.

Mount the angle-iron jackshaft brackets on  $\frac{1}{2}$ " S.A.E. machine bolts with nuts on both sides. The smooth bolt shanks pivot in rigid pillow blocks. Mount the spring brackets with wood screws and



**CONTROL LEVER**  
 $\frac{1}{2}$ " THICK ALUMINUM



sheet metal (see also photo on first page of story). Use small wood screws to join the fenders to the fins and the skirts to the fenders.

set the springs on long headless bolts.

**The control yoke** is bent from  $\frac{1}{2}$ " shafting and threaded at each end, or built up of  $\frac{1}{4}$ " pipe and elbows with the horizontal joints pinned or welded. Weld the control lug on at a 15-degree angle. Fasten the yoke to both jackshaft brackets by tightening nuts above and below.

Place the engine on the deck to locate the jackshaft blocks and to check for free



**START UPHOLSTERING** by sewing  $\frac{3}{8}$ " hems in  $1\frac{3}{8}$ "-wide strips of fabric-backed artificial leather. With the finished side down, tack the strips through the unhemmed part to the seat edge (hem down) and back edge (hem at rear). Cut covering 2" oversize. Tack both covers along bottom back line with cardboard strips as above.



yoke action. Mount the blocks with  $\frac{1}{4}$ "-by-5" bolts through the pillow blocks.

Jackshaft bearings must be the self-aligning type to prevent binding. They are adjustable in slots in the brackets to permit tightening of the belt. Be sure to put the 8" pulley and a 33" V belt on the shaft as you slide it into the bearings.

A shaft collar, a  $2\frac{1}{2}$ " pulley, and a reverse drum go outside each bearing. Before tightening any setscrews, file a flat in the shaft under each to avoid burring. Use hollow-head setscrews.

**Reverse drums** can be simple 2" flat-belt pulleys, or may be built up with some machining. The shaft hole must be true, but this is an easy lathe job. Use cast-iron or pressed-steel V pulleys. Fit 31" V belts from jackshaft to wheels.

Belt guards are a must where children are concerned. Make them of plywood and sheet aluminum. The inner one is a cage mounted on a tail fin. Deep fenders enclose jackshaft drums and pulleys.

**Control linkage.** Cut the control lever accurately to shape for proper latching action. File the long leg to a drive fit for a handle of aluminum or steel tubing. Push a bike handgrip on the top.

Thread the  $\frac{3}{8}$ " control rod at one end. Shape flat bar around  $\frac{3}{8}$ " rod to form the U bracket; then saw the legs to equal

.....

## Full-Size Plans

... for building the *Kinderwagen* are available. Send \$2 to:

**Gilliom Power Tools,  
1109 N. Second St.,  
St. Charles, Mo.**

.....

length and drill for the cross-pin. Have the bracket welded to the control rod, or attach it with bolts.

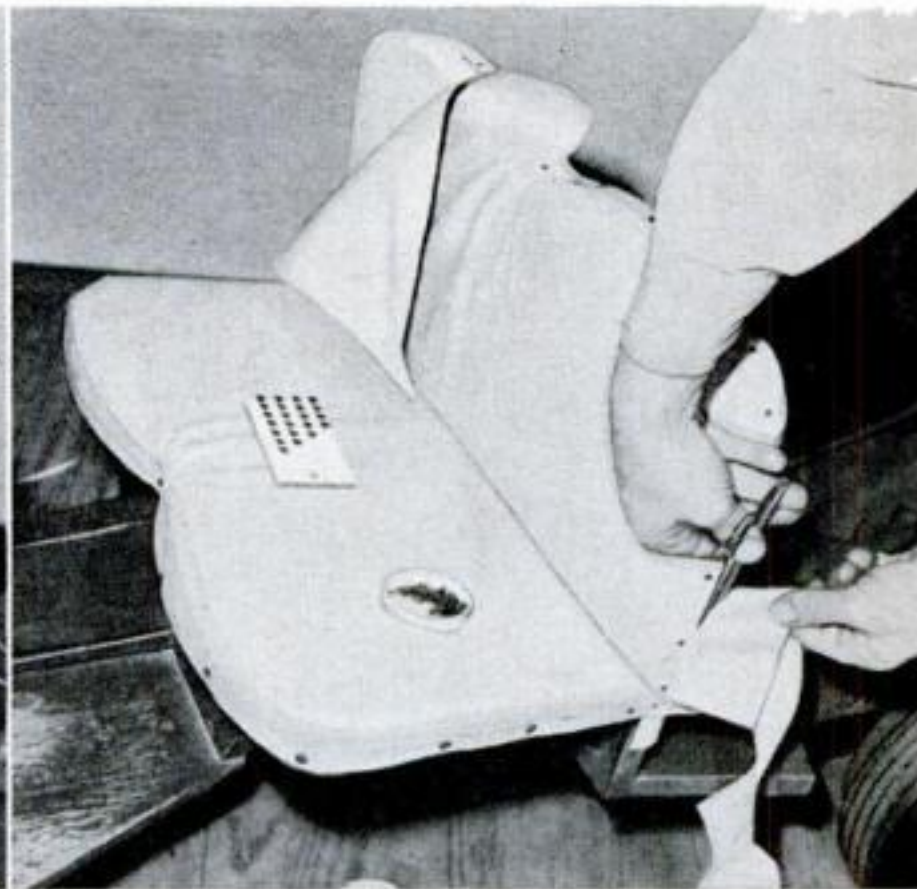
The lever pivots on a short shaft bolted directly to the floorboard. With the lever latched over in forward position, adjust the nuts against the yoke lug to tension the wheel belts. Lock the nuts a trifle apart to let the control lug move freely to reverse position when the lever is held back. Over-center toggle action should keep the lever engaged in forward.

**Engine mounting.** Use any four-cycle, horizontal-shaft engine of  $1\frac{1}{2}$  hp. or more. Fasten it with  $\frac{5}{16}$ " bolts through both engine deck and frame panel. A  $2\frac{1}{2}$ " motor pulley is recommended; a  $2\frac{3}{4}$ " or 3" one will give slightly higher speed.

For small children, the throttle cable is best hooked to the engine governor rather than the carburetor throttle.

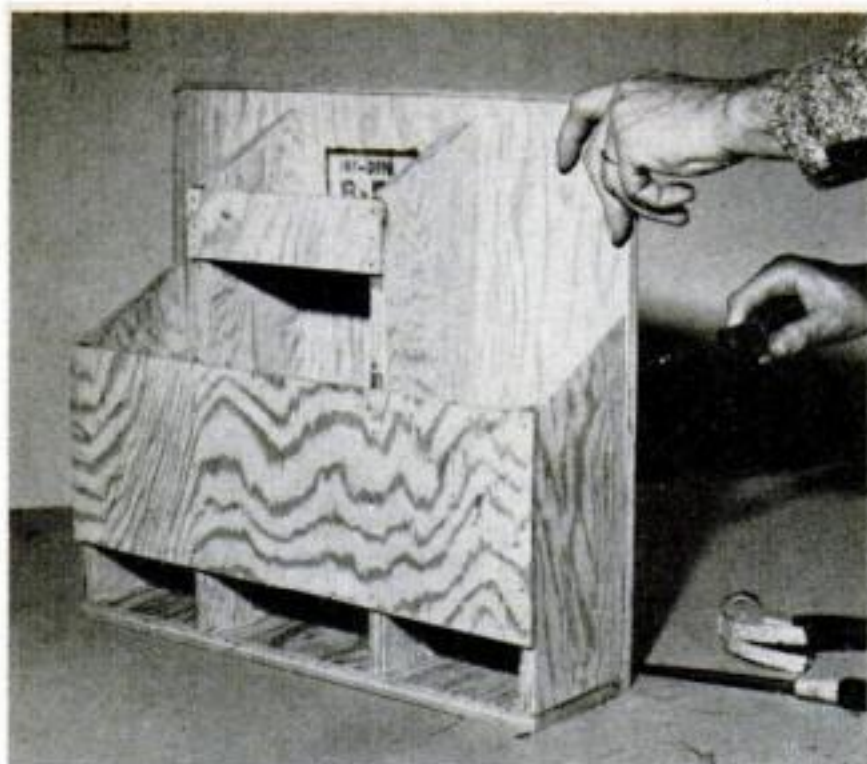


**CUT 1" FOAM RUBBER** to same shape as the wooden seat and back, but make the slab for the back  $\frac{3}{4}$ " short. Then bevel the edges of both pieces where they meet, as above. Fold back the covering from the edge at which it's tacked to cement the rubber to wooden seat and back surfaces. Use foam-rubber cement.

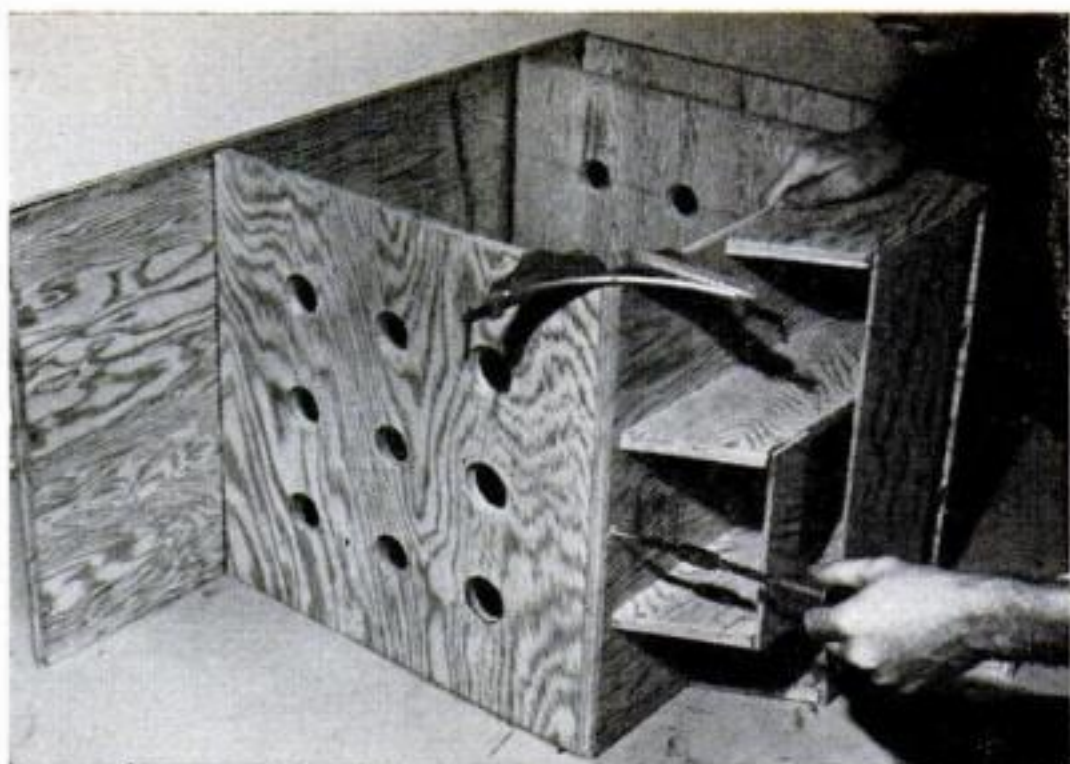


**PULL THE COVERING OVER** the foam-rubber slabs. Fold in excess fabric so you can tack the covering around the seat and back edges inside the hem line of the strips. Finally, fold these hems over the seat covering and fasten them with decorative upholstery tacks. Space the tacks uniformly for a neat appearance.





**POCKET FOR SMALL SUPPLIES** is assembled as separate unit and fastened to front of cart.



**FRONT IS FASTENED** to edges of shelves and bottom. A miter clamp assures square corners.

## Garden-Tool Caddy

**T**HIS wheeled caddy keeps a full selection of garden equipment at your fingertips as you work around the yard. At the end of the day, it's easy to roll the cart back indoors for storage of your tools and supplies.

Tools are held in separate sockets to keep them neatly arranged. Any empty sockets automatically show up missing tools so you can't forget them. The pockets at the front hold small items.

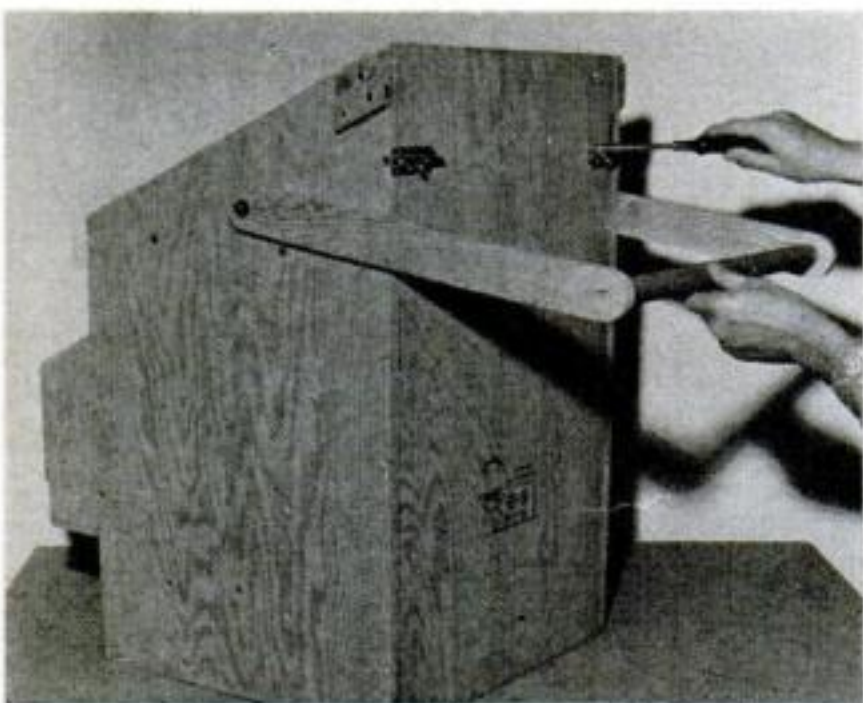
The cart is made entirely of  $\frac{1}{2}$ " plywood except for the two strips across the front of the pockets, which need be only  $\frac{1}{4}$ " thick. All  $\frac{1}{2}$ " parts can be cut from a single sheet of plywood. The panels merely butt together and are joined with

glue and  $1\frac{1}{4}$ " No. 8 flathead screws.

The sides should be laid out first because the angle at which they are cut at the top determines the degree of bevel for the upper edges of the front and back panels and the slant of the pocket. The cart's bottom and the two spacers that form the tool sockets are all 17" square. Clamp two of them together so you can drill the  $1\frac{1}{4}$ " socket holes through both at the same time. The two spacers and the bottom panel are then fastened to the back panel, and the front and sides are put on last.

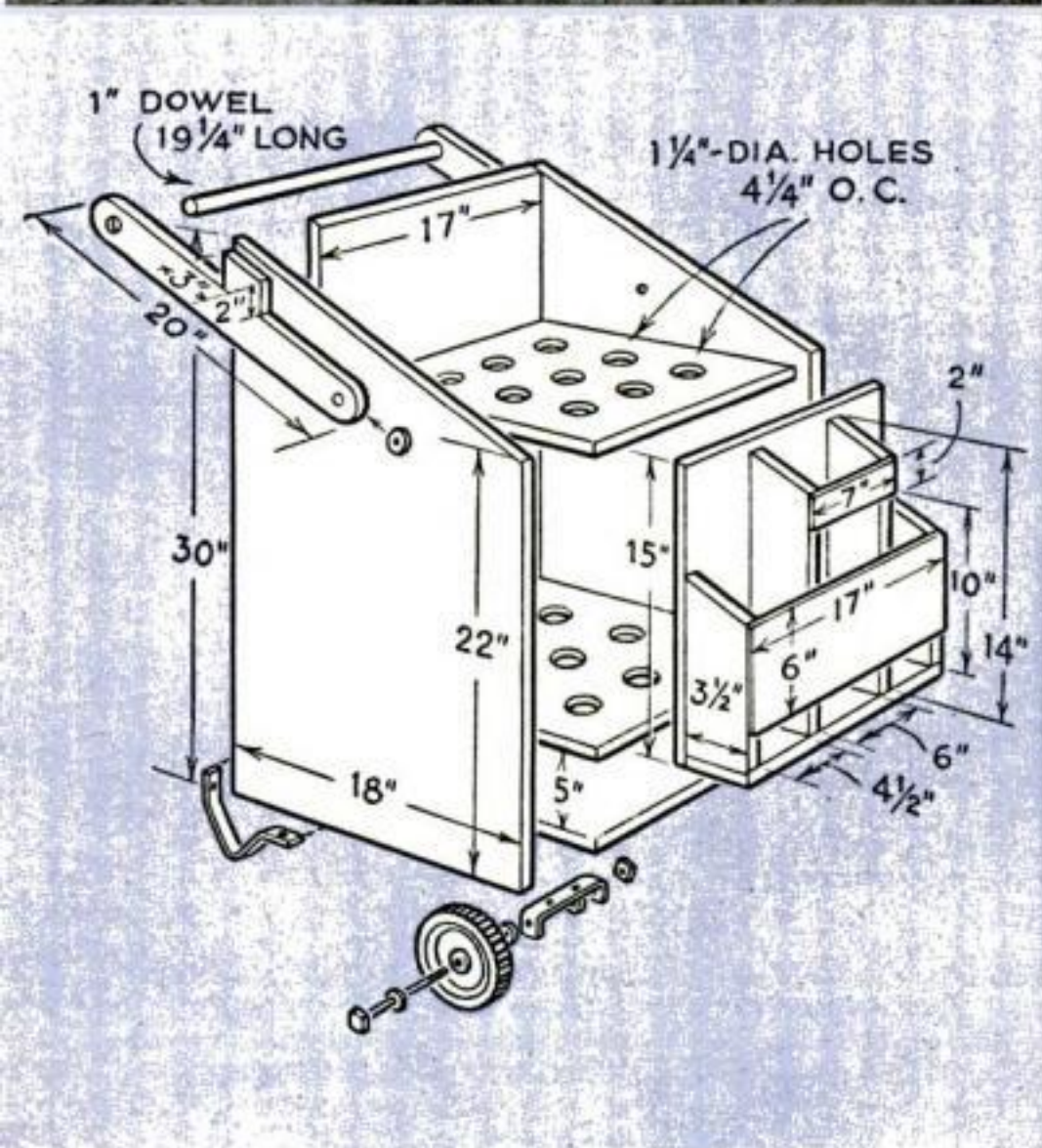
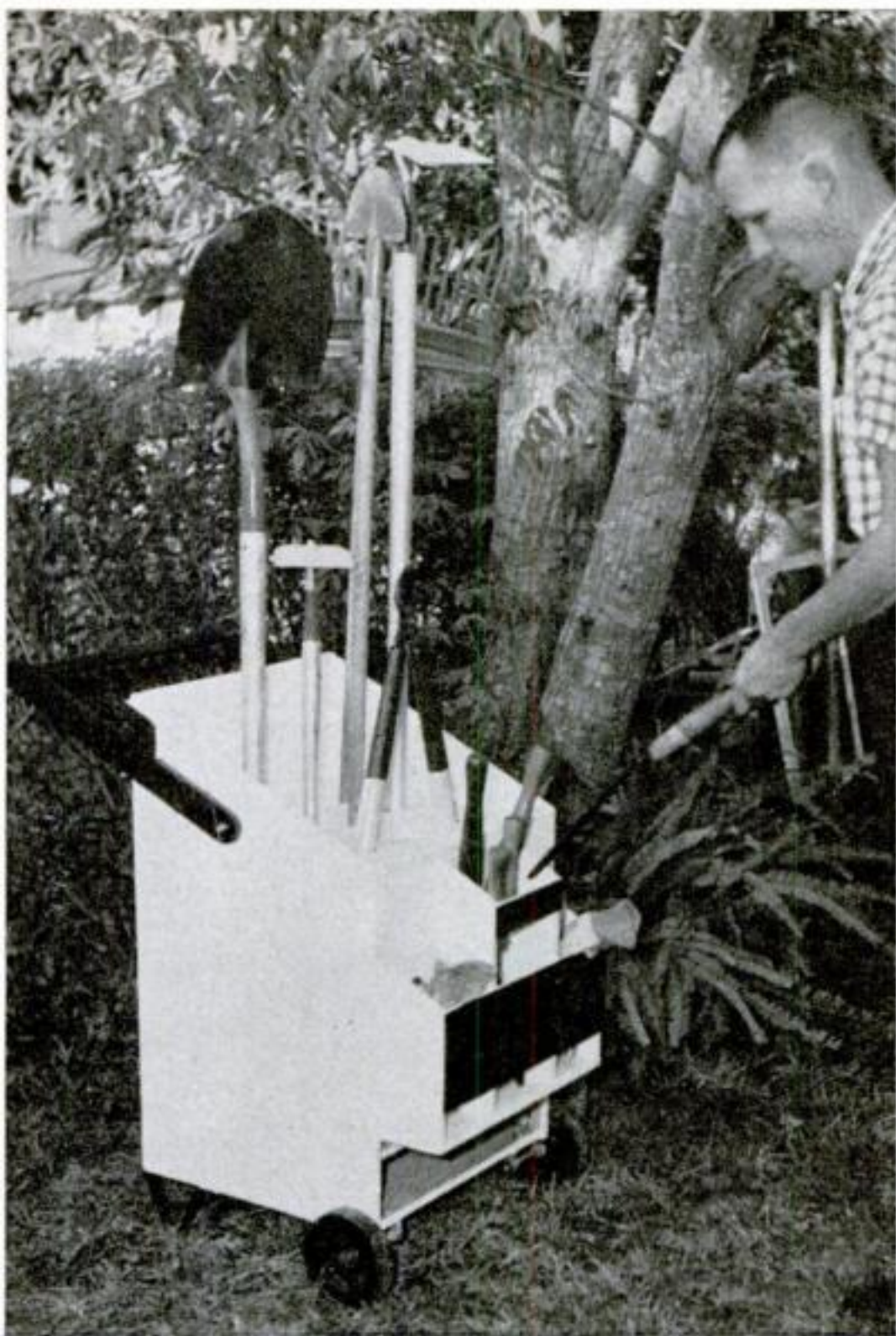
Buy a pair of ball-bearing wheels at least 6" in diameter for easy handling on uneven ground. The wheels are held by U-shaped brackets bent from 6" lengths of  $\frac{3}{4}$ " steel strap with long  $\frac{1}{4}$ " bolts run through them for axles. The brackets are easy to make if you drill  $\frac{5}{16}$ " holes at the ends of the 6" strips before bending them into a U shape. The back legs are bent from  $\frac{3}{4}$ " aluminum bar. Attach the back end of each leg, then adjust the height of the legs to level the cart before fastening the forward ends.

The handle pivots on  $\frac{1}{4}$ "-by- $1\frac{1}{2}$ " carriage bolts and is locked in its raised position by sliding a latch bolt under each side. When storing the cart, the handle can be dropped to save space. For a durable finish, apply a sealer and several coats of good exterior enamel.—*Oscar Parsons, Hialeah, Fla.*



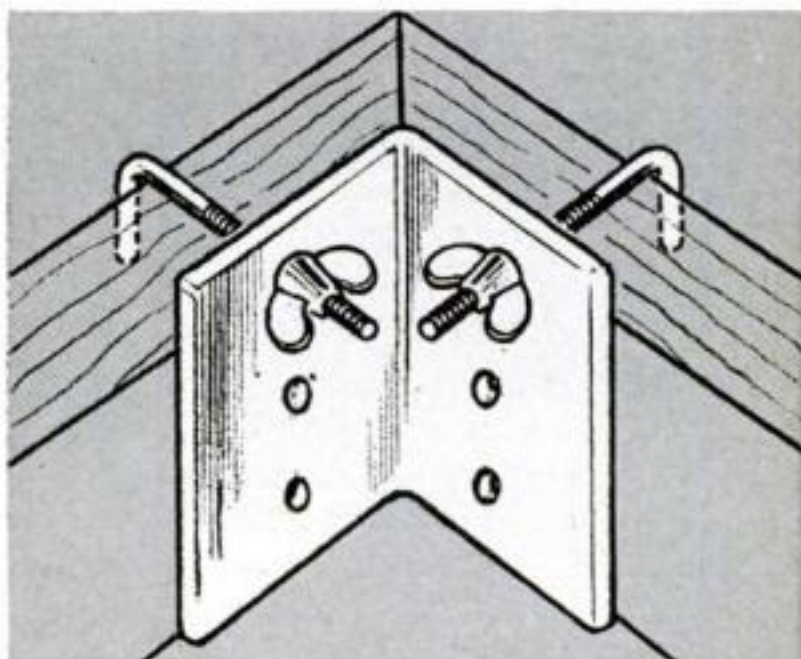
**LATCH BOLTS** lock the handle up against stop blocks, allow it to be lowered for storage.





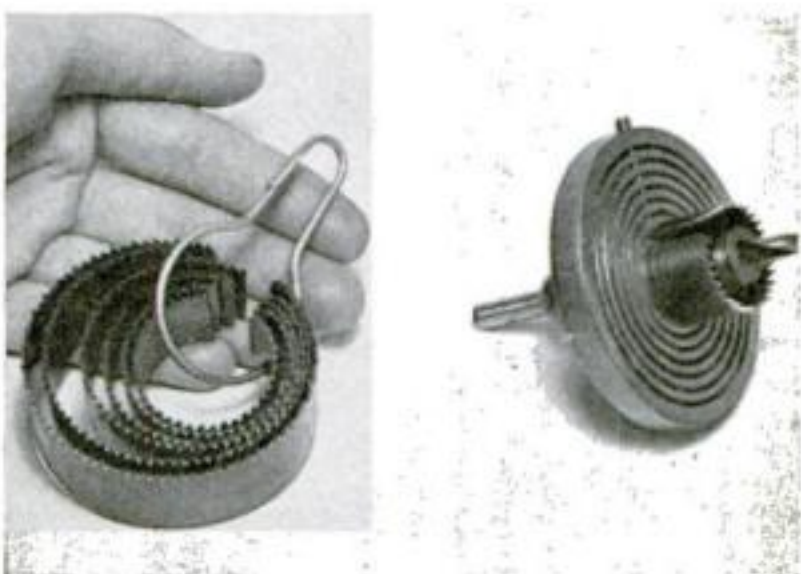
### Novel Ash Trays from Pistons

OLD pistons make rugged, sporty-looking ash trays. Hacksaw through the wrist-pin bushings to form U-shaped holders and polish the metal bright. —*W. Ellerington, Barrhead, Alberta.*



### Clamps Made from Angle Iron

YOU can hold mitered frames together for gluing or nailing with clamps improvised from angle irons. Drill the angles as shown to take L-shaped hooks threaded for wingnuts. —*M. Robert Beasley, Detroit.*

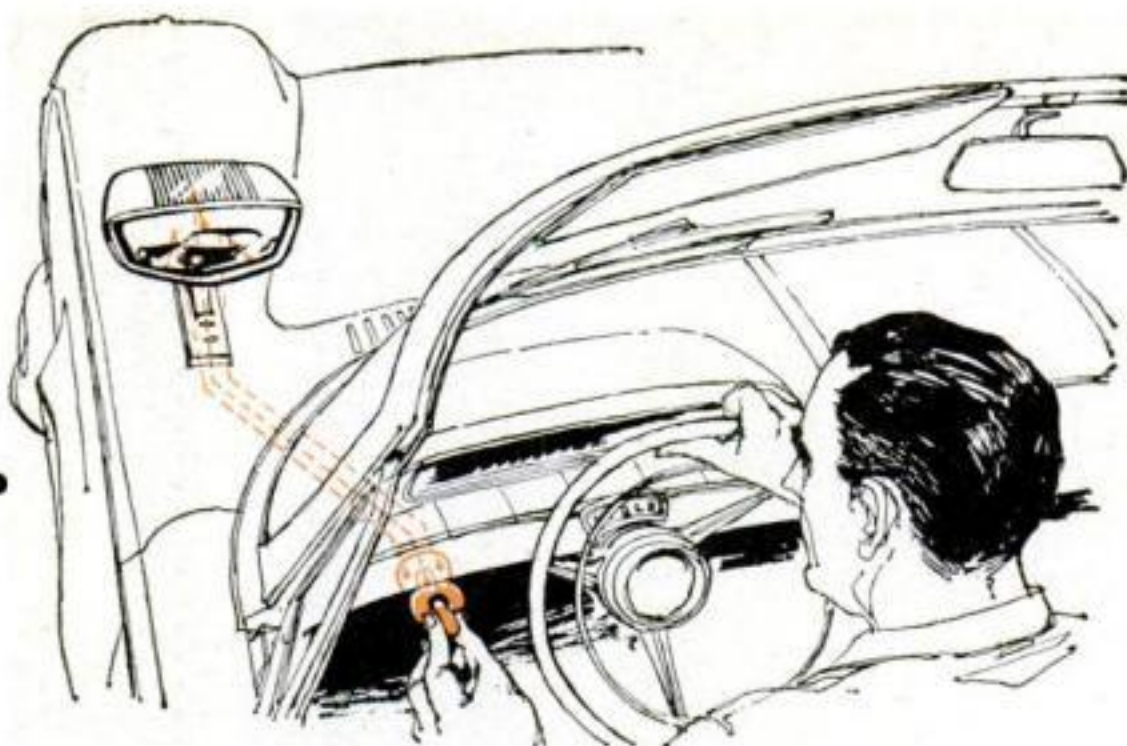


### Ring Keeps Blades Safe

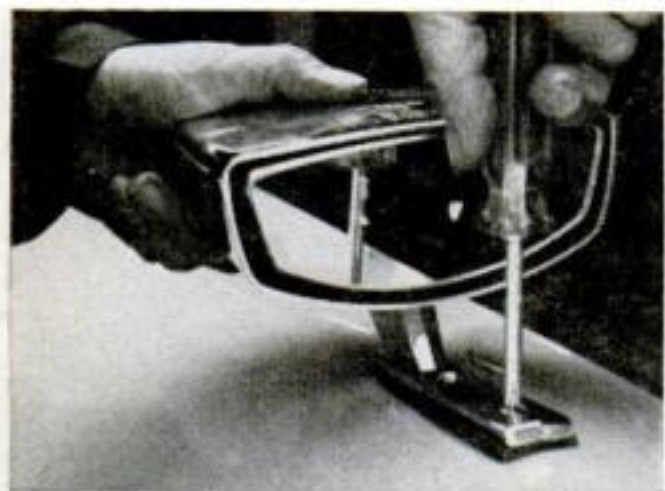
TO KEEP a set of hole-saw blades from getting lost, string them on a shower-curtain ring or wire. This also lets you hang them on a tool board. —*John A. Comstock, Wellsboro, Pa.*



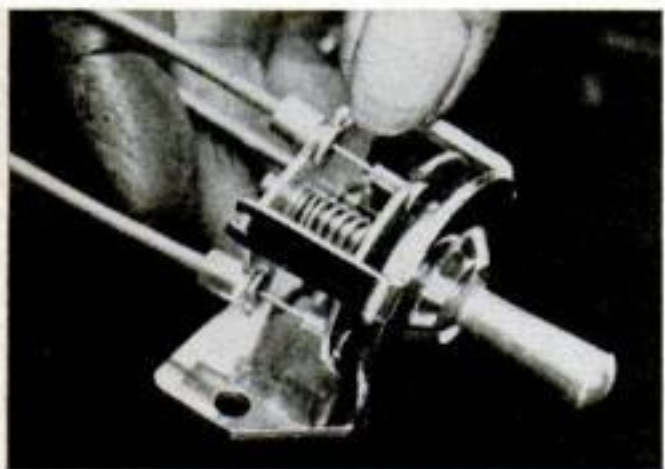
# How I Installed a Remote-Control Car Mirror



**CONTROL CABLES** go through a  $\frac{3}{8}$ " hole drilled in fender. Two  $\frac{1}{8}$ " mounting holes also are needed.



**MOUNT THE MIRROR** with self-tapping screws. A gasket goes under the base of the mirror.



**HOOK CABLE ENDS** to control-lever assembly this way. Assembly goes behind instrument panel.

**R**EMEMBER the last time a passer-by brushed against your side-view mirror and knocked it out of line? You had to climb out of the car, re-adjust the mirror, climb back in, and check the angle. Chances are it took several trips before the mirror was back in position.

Far easier to flick a dashboard lever that enables you to change mirror angle without leaving the car. Now, thanks to the mirror kits on the market, such an installation is simple.

The unit shown here, sold by the Roberk Co., Norwalk, Conn., for about \$13, consists of a futuristically styled mirror, three cables, a dash-mounted control housing, and necessary hardware. The mirror frame remains stationary; a push or pull on the dash lever translates the same motion to the glass itself via the cables. The glass tilts upward, downward, or from side to side.

First select the proper location for the mirror. Check the fender underside to make certain the cables can pass through without interference. Also be sure that the mirror clears the hood. Next, using the mirror-base gasket as a template, mark the holes to be drilled. Centerpunch the marks with a nail or other sharp object, and drill two  $\frac{1}{8}$ " holes and one  $\frac{3}{8}$ " hole.

Feed the control cables through the  $\frac{3}{8}$ " hole, and then secure the mirror to the fender with two self-tapping screws provided in the kit. Most cars have extra holes in their firewalls; if yours does not, drill a  $\frac{3}{8}$ " hole. Pass the cables through into the passenger compartment and slip the brass bushings at the ends of the cables into the appropriate terminals on the control-lever assembly. Drill two  $\frac{1}{8}$ " holes in the underside of the dashboard to the left of the steering wheel and mount the control assembly with two self-tapping screws. Mirror angle can now be controlled by moving the dash lever in the corresponding direction.—*Alex Markovich.*





# Straight Talk About Extra Lenses

***Tempted by a telephoto or wide-angle lens? Here's what they can do for your pictures***

**By Phil McCafferty**

**G**LEAMING in photo-dealers' display windows these days is a seductive array of extra lenses. Probably you have eyed these fairly expensive pieces of glass, wondering just what they would do for your pictures.

*Ask a pro* and he'll tell you of the great flexibility they offer. Every serious amateur should weigh their possibilities. Still, they aren't miracle-workers. There's precious little that extra lenses can do that can't be done with a "normal" (standard) lens by changing camera position. Consider these basic facts:

- A wide-angle lens increases the angular size of the scene the film sees. In doing this, it records every part of the scene smaller than a normal lens would.
- A long-focus lens decreases the angu-

## **Lens Terms Defined**

**Aberration:** Effect produced by failure of a lens to bring light rays from an object into sharp focus. A "soft" image results.

**Depth of field:** Distance from farthest to nearest objects apparently in sharp focus.

**Distortion:** Any departure in the image from a true two-dimensional representation of a three-dimensional scene.

**Focal length:** For practical purposes, the distance from lens to film when the lens is focused at infinity. At a given distance from an object, the longer the focal length of a lens, the larger the image on the film.

**Long-focus lens:** A lens with focal length greater than the diagonal of the film on which it projects its image. In common reference, often bunched with telephotos.

**Telephoto lens:** A special type of long-focus lens designed for compactness—i.e., to produce the same large-image effect in shorter lens-to-film distance. It's smaller, easier to handle, usually costs more.

**Vignetting:** Underexposure of film in the corner areas. Caused by failure of a lens to transmit light equally over entire area.

**Lens coating:** A chemical coating on lens surfaces to prevent internal reflections that would detract from image sharpness.



## How lenses differ



IMAGE

FOCAL LENGTH

LENS

**NORMAL**

COVERAGE ANGLE

**NORMAL LENS** has a focal length that is roughly equal to the diagonal of the image produced on film. Its angle of view ranges from 50 to 60 degrees—photographically, an average coverage.



FOCAL LENGTH

IMAGE

LENS

**WIDE-ANGLE**

COVERAGE ANGLE

**WIDE-ANGLE LENS** has a focal length that is less than the longest side of the image it produces on film. It has usually a 75- to 100-degree angle of view, giving a relatively broad coverage of the scene it takes. But object size is sacrificed. Compare bridge above with appearance through other lenses.

## Which Lenses Do What Jobs

FILM SIZE	FOCAL LENGTH		
	NORMAL	WIDE-ANGLE	LONG-FOCUS
8-mm. movie	12.5-13 mm.	5.5-10 mm.	24 mm. and longer
16-mm. movie and still	25-26 mm.	10-17 mm.	50 mm. and longer
35-mm. still	44-55 mm.	21-35 mm.	80 mm. and longer
2¼" by 2¼"	75-80 mm.	38-60 mm.	105 mm. and longer
2¼" by 3¼"	101-105 mm.	47-65 mm.	135 mm. and longer
4" by 5"	135-165 mm.	65-90 mm.	180 mm. and longer

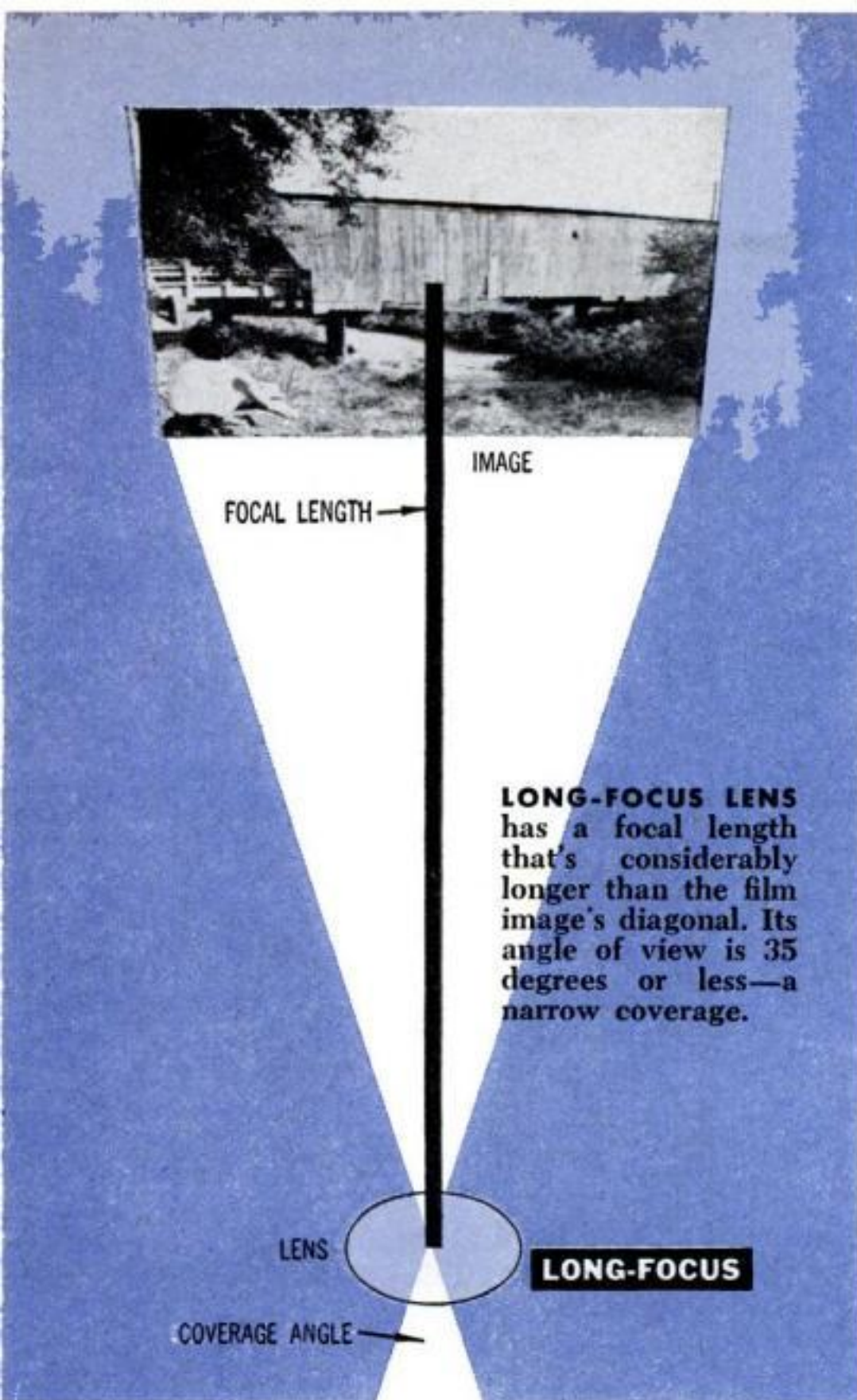
lar area of the scene that the film sees, and records what it does see larger.

In practice, of course, it is often impossible or undesirable to move in or back with a normal lens to get extra-lens effects. Backing up to get a wide-angle rendering might put you out a window. Closing in to get a telephoto effect may spoil a candid shot. Trying to get a telephoto effect during enlarging can bring grain trouble, particularly with small negatives. And in the case of slides and movies, you're entirely stuck with what a normal lens records.

**What wide angle offers.** Here are some specific effects. When you switch to a wide-angle lens without changing camera position, you:

1. Increase coverage but decrease size of images; and ...





**NORMAL**



**WIDE-ANGLE**



**LONG-FOCUS**

2. Keep more of the scene in focus. (If you decrease image size, you add to the depth of field.)

When you switch to a wide-angle lens and also move in closer, you:

1. Eliminate distracting foregrounds, and...

2. Make near objects seem larger in respect to far objects. For example, a car will seem longer and lower; an ice-cream cone in a kid's extended hand will seem as big as he thinks it is.

You'll also find a wide-angle lens fine for scenic shots where a feeling of vastness is desired—in addition to the regular use in interiors and when you can't move back.

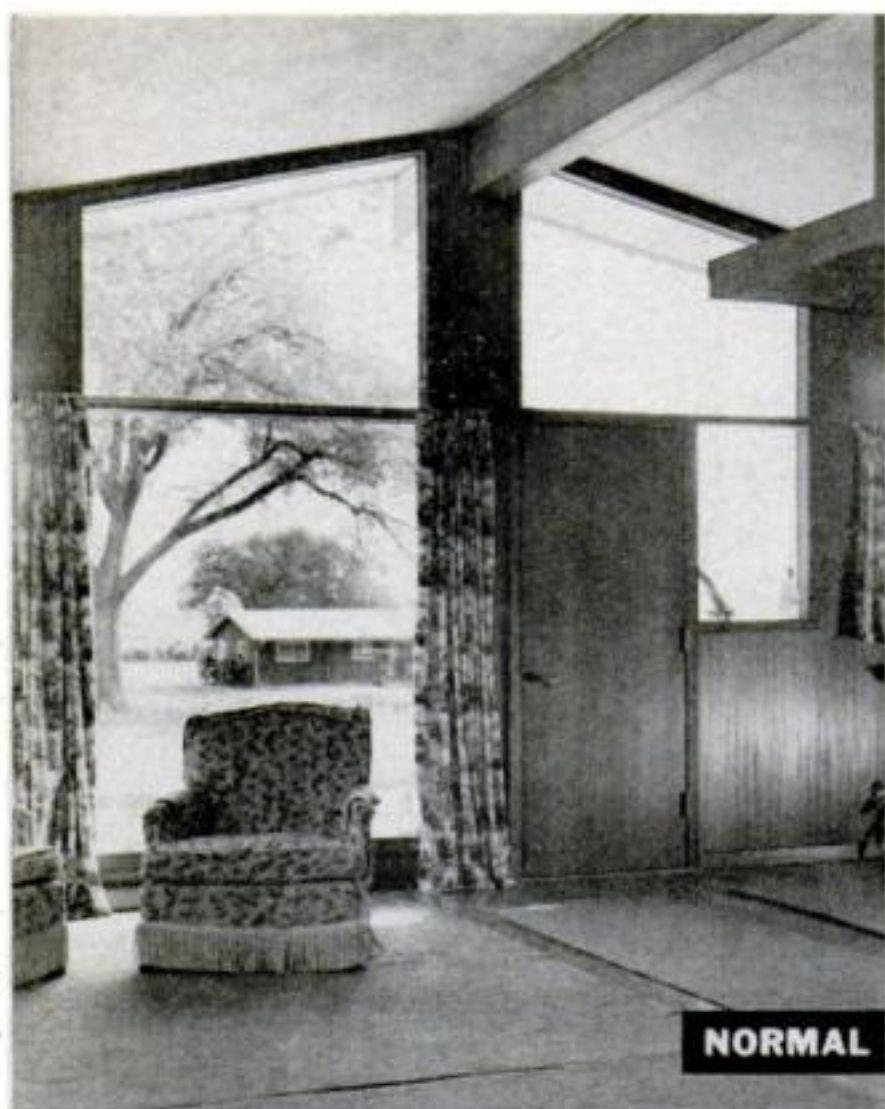
**Switching to a long-focus lens, and retaining camera position, you:**

1. Increase the size of objects at the

### What different lenses see

**SHOOTING THE SAME SCENE** from the same position, but with different lenses, produced these three prints. Notice that although the coverage and subject size vary, the perspective does not. Perspective depends on the camera's position, not on the focal length of the lens.





## Only a special lens can take some pictures

**SHOOTING AN INTERIOR** with a normal lens is tough: There's seldom enough space so you can step back to catch a sizable area. A wide-angle

lens, with its extra coverage, makes the job easy. But keep the camera dead level or vertical lines in the picture will converge sharply.

## Tips for Wise Buying of Lenses

**What to buy:** Avoid the extremely high-speed lenses unless you have real need for their slightly greater light-gathering ability. Using the newer fast films accomplishes the same thing less expensively. Slower lenses cost much less, often give better definition at all openings. Best, too, to steer clear of the extreme wide-angle and long-focus lenses. Moderate focal lengths may prove generally more useful.

**What's in a name?** "Name" lenses often bring a premium price and may serve your purpose no better than a less expensive one.

**Try-out:** Even apparently identical lenses vary in quality. Most dealers will sell you a lens on a one- or two-week trial basis.

**Testing:** For a wide-angle, photograph a double-sheet of your newspaper's classified section pinned to the wall. Make a print. Type should be legible at all corners. For a long-focus, shoot an object with detail (ironwork, brick wall) some distance away. Look for softening of lines in picture.

**Attachment lenses:** Some lenses fit over your regular one to produce telephoto or wide-angle effects. Usually less satisfactory than the real thing, but for not-too-demanding use, acceptable. Inexpensive.

film plane, at the cost of coverage, and . . .

2. Reduce the proportion of the scene that is in dead-sharp focus.

Moving back with long-focus (or telephoto) lens will:

1. Allow you to duplicate coverage of a normal lens but include objects that might have been behind the camera with a normal lens, and . . .

2. Compress depth, making far and farther objects seem close together. In a shot of rush-hour traffic, the cars will seem packed like sardines; or the kids will seem dangerously close to the beasts in the zoo.

You'll use a long-focus lens most often for sport and wildlife shots, some scenics, and whenever you can't move up. It has an extra dividend: Portraits often have less distortion through a long-focus than through a normal lens.

**Flexibility**, then, is the great virtue of extra lenses. Even if they are not wonder workers, even if you'll still want to move up or back, they'll help your pictures. A range of focal lengths at your disposal can make each few movie frames, each slide, or each print stand out in individual meaning.





**YOUR GUIDE TO TIRE FACTS FROM**

**TYRA**





## WITHOUT TIRES YOUR CAR WOULD BE LIKE A SHIP OUT OF WATER

Tires can and DO affect the way your car performs on the road . . . the way it steers, the way it stops, the way it rides . . . the feeling of safety it affords.

In the following pages you'll learn a lot of valuable things about tires. Just to mention a few: facts about tire buying, tire maintenance, how to get the most mileage out of your tires.

**TIRES NEED CARE** — True — all tires are better made today . . . safer, stronger, more dependable over the miles, True — the new tubeless tires, with which most new cars come equipped, have lessened the possibility of sudden, violent blowouts to a fractional minimum. But don't get the notion that tires have now reached a state where they can practically take care of themselves . . .

**NO TIRE IS BLOWOUT-PROOF . . . your tires will serve you long and well only if YOU see to it that they do!**

So read these pages carefully and you'll be that much wiser about the tires you should have and the care they should get . . . information essential to everyone who owns and/or operates a car.



# **BUYING TIRES**

***how to get your money's worth***

**Know tire "grades"** — As a guide to tire quality, you can generally go by tire-line designations: premium, first, second, and third. These grades, or classifications, differentiated by price, technically should relate to tread-mileage wear. For example, you could expect to get only about half as many tread-miles out of a third-line tire as you would a first-line or premium tire. Manufacturers classify their various grades of tires by giving each one a different name. While line designations of different brands don't relate to each other, model names within a brand should indicate relative grades of tires. Be sure your dealer makes these classifications clear to you while you're considering which tires to buy.

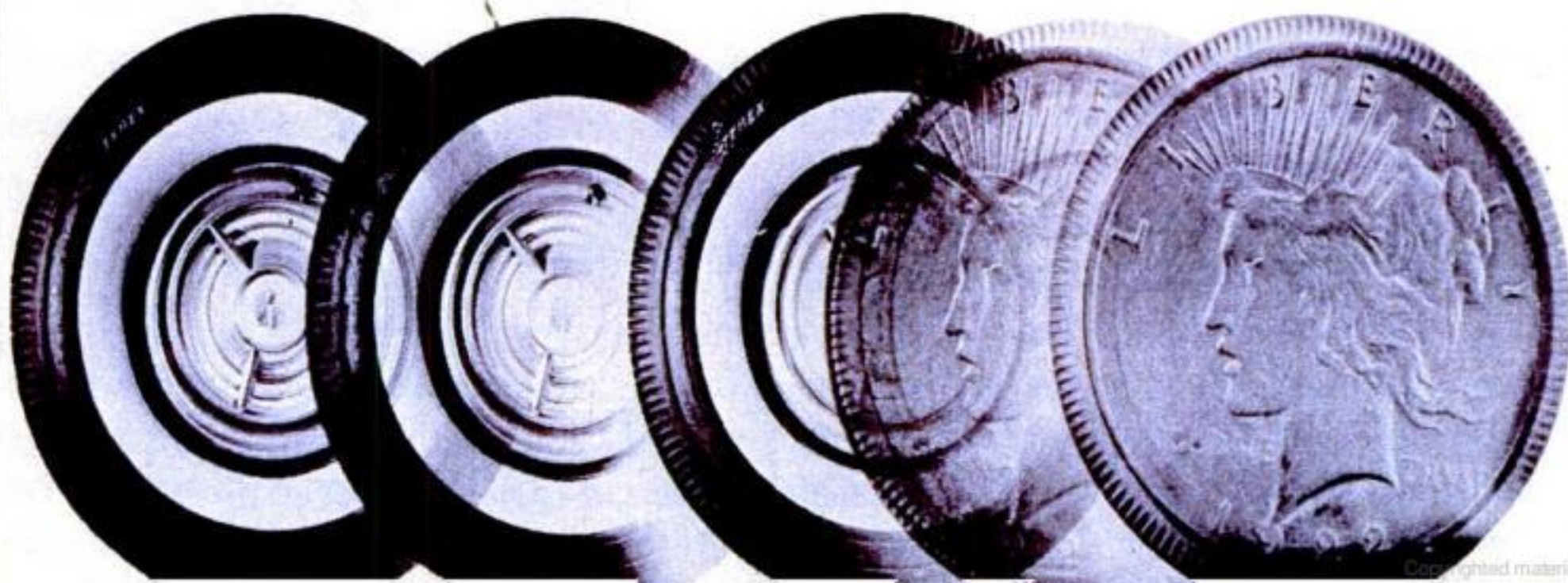
**Examine "Original Equipment" Claim**— The tires chosen to be original equipment on new American cars are classified by their manufacturers as "first-line" or "100-level." Remember that tires offered as "the same as original equipment" should actually be the same grade — like first-line tires made with TYREX tire cord, used on every American make of new car since the 1959 models.

**When To Buy New Tires** — Squeezing those last few miles out of tires that are worn and

scarred isn't wise for a number of reasons. You're playing with danger, for one. And you're actually losing money, for another. Tires with some life left can usually earn you a helpful trade-in allowance at your dealer's.

**Gauge tire needs by roads you drive**— Consider the conditions under which you normally drive. While most of us cover a variety of roads in the course of a year, much of our driving is done in a fairly fixed pattern. Many drive chiefly on city or suburban roads that call for a good all-around tire. Others, such as salesmen, spend a good deal of time on long, fast turnpikes and thruways demanding tires that run cool and give above-average safety and mileage. Your tire dealer can be of great assistance to you here. Let him know what your tires have to face and he'll be better able to recommend the best tires for your needs.

**It Pays To Shop Around**—As with any product, tires in the same range of quality have their price differences, too. When shopping ask about tread-mileage, safety features, all-around dependability. Examine guarantees carefully. You'll find the best tire buys by looking for them.





## **why tire cords are important**



**The backbone of a tire is the cord used to make it. Therein lies a tire's basic safety and strength.**

The first step in making a tire is to weave tire cords into a fabric. The cords are then coated and fused with rubber to form thin sheets known as plies. Next — the plies are put together (usually four to a passenger-car tire) to make the cord body or carcass. To this is molded the rubber tread and sidewalls of a tire.

As you can see, the cord in a tire IS its mainstay, its muscle — literally the fabric that holds a tire together, largely determining its degree of strength and endurance.

But what you might logically wonder at this point is whether there's much difference between one cord and another. The answer is yes — especially with the introduction of TYREX tire cord, hailed as a major scientific breakthrough in this field.

**How TYREX tire cord differs from rayon and nylon** — Both rayon and nylon are basically adaptations of fibers originally produced for textile uses. Obviously, the properties required of a tire cord are distinctly different from those deemed suitable for clothing or home furnishings. In response to these inadequacies of existing fibers, research scientists developed a material specifically engineered for tire cord. This is how TYREX tire cord came about, and how it was possible, in

designing it from scratch, to incorporate all the good points of other tire cords while eliminating their weaknesses. Because TYREX tire cord is a fiber produced from cellulose (the same material nature uses to give strength to trees and other plants), it has a built-in dimensional stability relatively unaffected by varying conditions of heat, cold, and excessive strain.

**Which tire cord is the best for you?** In this day of modern technology and high-powered competition, it is often difficult to judge for ourselves what is the best product to buy. Fortunately, this is not the case with tire cords.

We have a sound bench mark to judge by — the automobile manufacturers of America.

**It is significant that for the past years, car manufacturers have made tires with TYREX cord original equipment on every single make of American car!**

This unanimous endorsement is especially important because automotive manufacturers won't use a product until they test it for themselves and know what they're getting. After all, with the good names of their cars at stake, nothing but the best will do.



6.70 X 15  
7.50 X 14  
7.50 X 16

### ***how to decipher those tire-size figures***

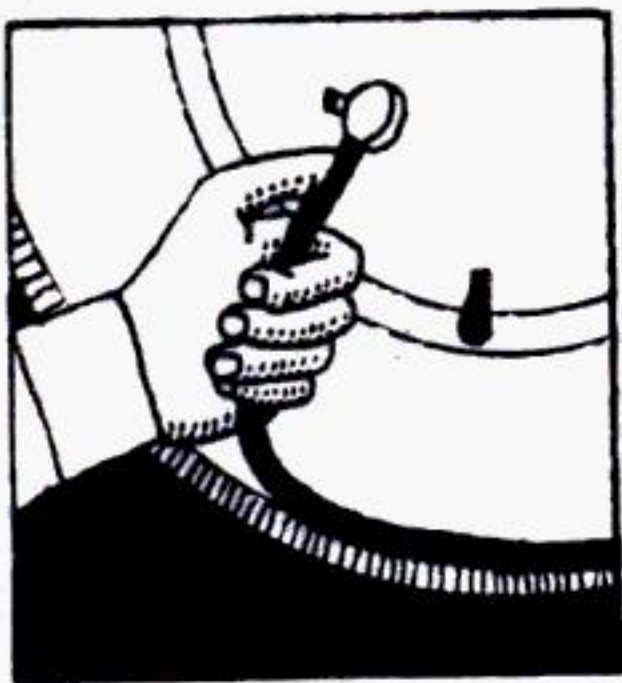
Using a 6.70 x 15 tire as an example —“6.70” means six and seven-tenth inches and denotes the approximate cross-section width of the tire (from sidewall to sidewall) when it’s inflated to the manufacturer’s recommended air pressure.

The “15” means 15 inches and refers to the diameter of the rim (or wheel) the tire is mounted on.



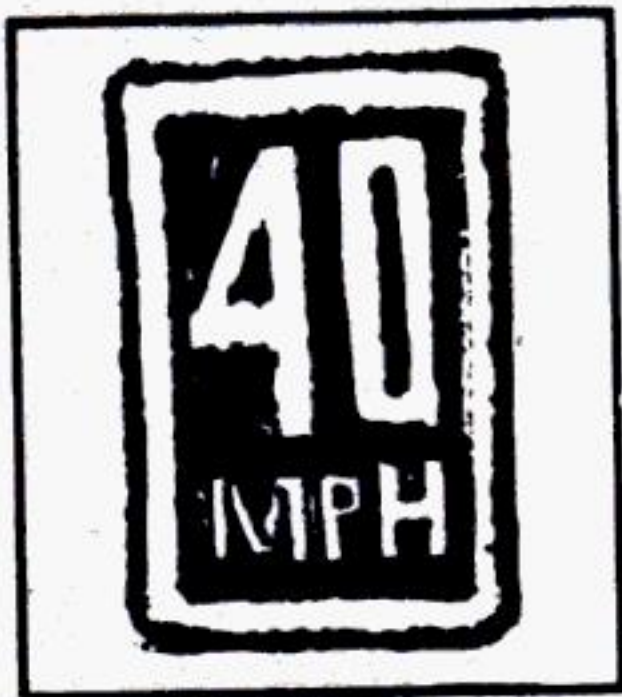
# 7 WAYS TO STRETCH

1



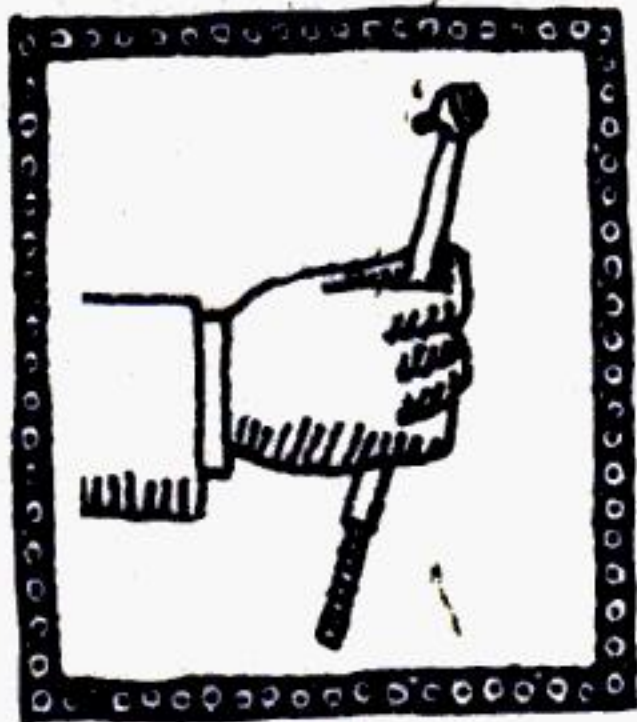
**Keep Tires Properly Inflated** — You'll find a statement concerning the right amount of air your tires should carry in the owner's manual that came with your car. Many tire experts, however, recommend these pressures as a general rule: Keep 28 pounds of air all around in 14" or 15" tires; 30 pounds all around in 16" tires.

2



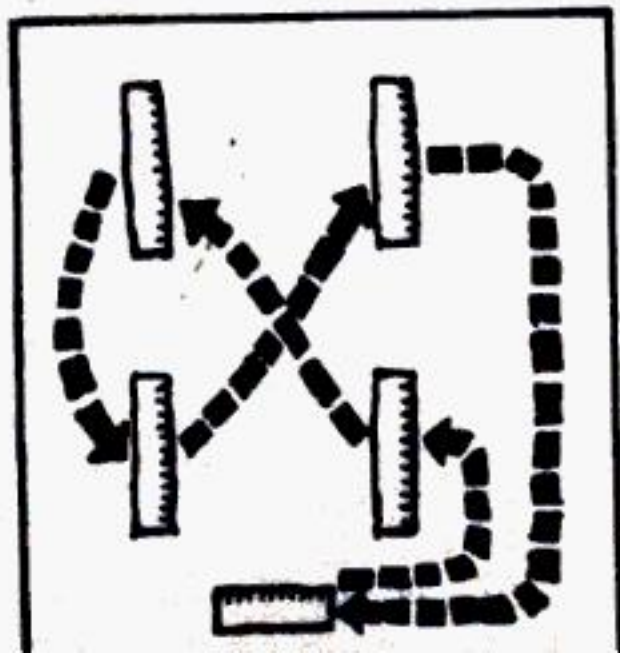
**Go Easy On New Tires** — Stick to new-car speeds when you're breaking in new tires: 100 miles at 40 m.p.h., then 500 miles at 50 m.p.h. This will give cords a chance to mesh and flex together before the going gets rough. Your tires will last longer, say Detroit test drivers, if they get through the first 5,000 miles without abuse.

3



**Check Air Pressure** — After you put on new tires, keep tabs on the air pressure. (Get an accurate tire gauge and keep it in your car). During the first few days of use, new tires tend to lose pressure. Underinflation can kill a tire . . . shorten its life by 20%. So be on your guard, especially during the crucial breaking-in period.

4

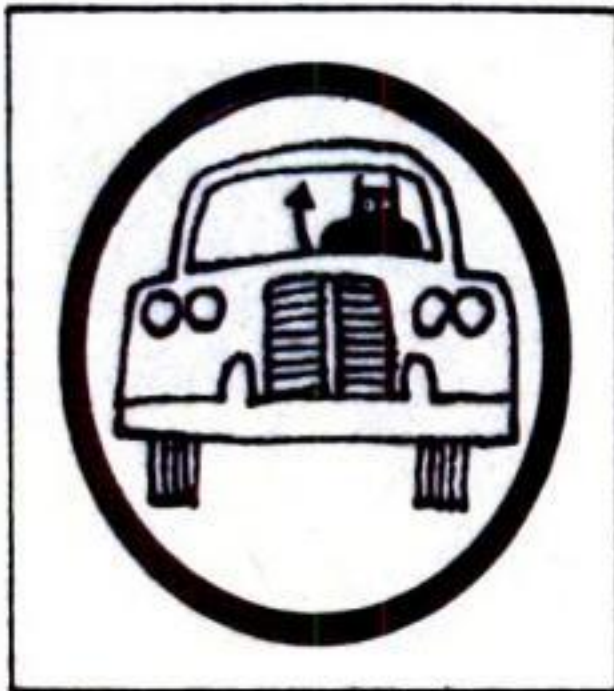


**Rotate New Tires Every 2,000 Miles** — This is one of the best ways to get your tires to last. Have all five tires rotated every 2,000 miles for the first 10,000 miles. After 10,000 miles, rotate at 5,000 mile intervals. When tires are not rotated, uneven wear can lead to shimmy, vibration, noise, or a bumpy ride. (See chart for proper tire rotation.)



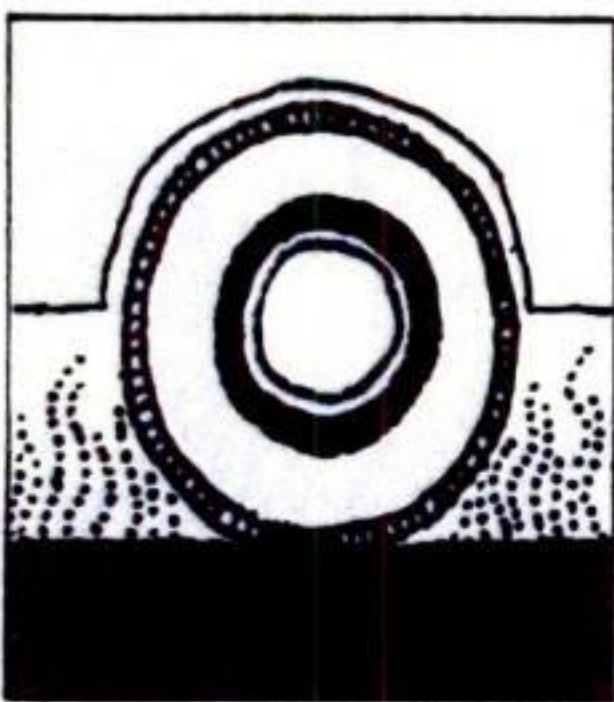
# CH TIRE MILEAGE

5



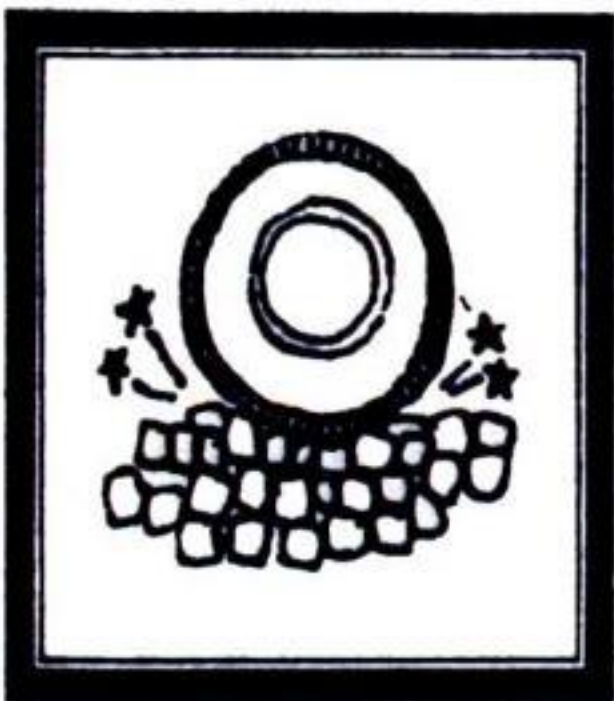
**Don't Be a Speed Demon** — Sustained speed builds up high temperatures, and heat can tear a tire to pieces. Excessive speed also causes dangerous distortion in tires (more severe when tires are overloaded or under-inflated) which in itself causes tremendous heat build-up. This kind of strain can cause a tire to literally come apart. At 80 m.p.h. you can expect only 20% of normal tread wear.

6



**Leave Hot Tires Alone** — Never reduce air pressure when tires are hot. A tire is built to take the extra pressure. Bleeding (letting air out) only makes it run hotter. Remember that soft, under-inflated tires are dangerous, causing sidewalls to flex, friction to increase. In fact when high sustained speeds are anticipated, it's a good idea to increase air pressure four pounds above normally recommended cold-starting pressure.

7



**Be Kind To Your Tires** — Bumping or scraping curbs, turning corners too sharply, stopping too suddenly, starting too abruptly, driving too fast over bumps and ruts, is the quickest way to wear out a tire. There's strain enough on tires in ordinary driving without piling on extra punishment! So take it easy. Treat your tires with care for longer wear.

... and don't overlook these car care tips!









# *keep your car fit for longer tire life!*

## **Check:**

**EXCESSIVE CAMBER:** When wheels are tilted inward or outward, it causes rapid wear on one side of your tires.

**PRONOUNCED TOE-IN OR TOE-OUT OF WHEELS:** This condition usually shows up as "feathered edge" on tires and in abnormally rapid wear.

**FAULTY OR GRABBING BRAKES:** You can recognize this trouble by bald spots — the same symptom produced by unbalanced wheels.

**IMPERFECT OR WORN SHOCK ABSORBERS:** Not only do faulty shocks cause irregular tire wear but they may also lead to other mechanical irregularities.

**FRONT-WHEEL ALIGNMENT:** Excessive wear around one side of tread is a sign of bad alignment . . . can ruin new tires in days. Check alignment at least every 10,000 miles.

**WHEEL BALANCE:** Heavy side of unbalanced tires slams hard against road, causing worn or bald spots. "Bumping" can often be felt in steering wheel. Check wheel balance even on new cars.

## *tips about tubeless tires*

**WHEEL RIMS MUST BE IN A-1 SHAPE** — Leaks can be caused in a tubeless tire by dented or rust-pitted wheel rim or by loose rivets in rim. Have rims checked before buying tubeless tires.

**EVEN A SPECK OF DIRT IS DANGEROUS** — It's important that tubeless tires be mounted carefully. Should sand or dirt get between bead and rim, air leaks may result.

**DON'T BE A "ROAD-HOPPER"** — Driving on and off the edge of the road at high speed can cause the loss of air. Also avoid hitting curbs — you may find you have to replace all of the air if you do.

## *does it pay to retread?*

This is entirely up to you. Taxi fleets, trucking companies and air lines all successfully retread tires for economic reasons. So can you, if your tires have a good recappable carcass. (A rugged carcass is one of the dividends of tires made with TYREX cord.) A good retread job can give you very satisfactory mileage and reliability.

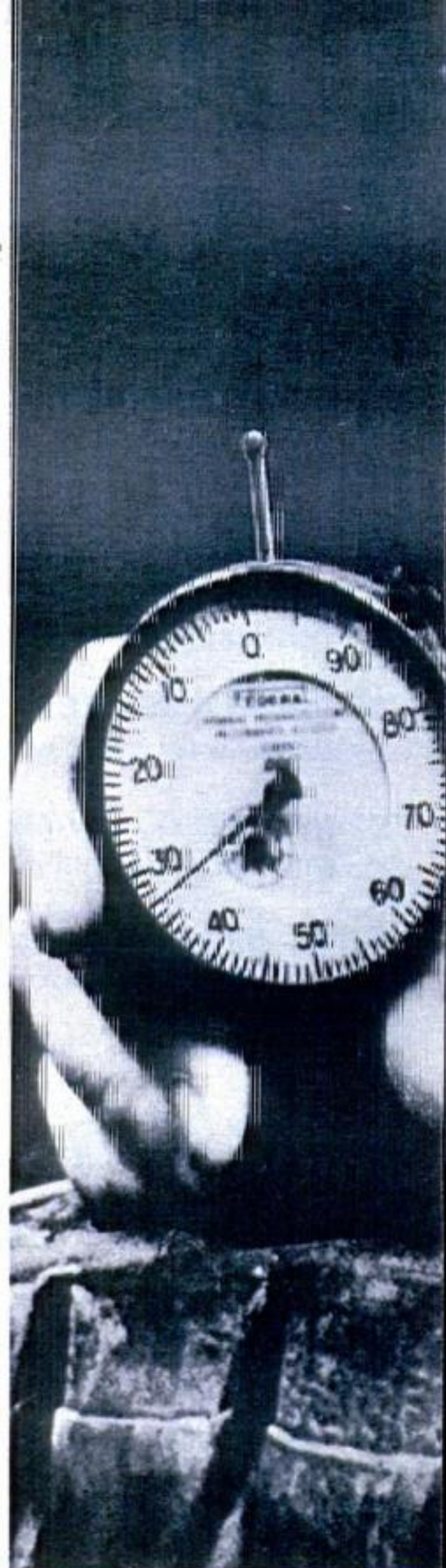




1. Tires made with TYREX cord **RUN COOL AND SAFE!** Test after test shows that tires made with TYREX tire cord are highly resistant to heat at modern highway speeds.



2. Tires made with TYREX cord are **MORE RESISTANT TO IMPACTS!** In grueling accelerated road tests, tires made with TYREX cord averaged less than one-third as many impact breaks as nylon.



3. Tires made with TYREX cord are **LONGER WEARING!** Tested on taxis, trucks, all models of passenger cars, they regularly give the best mileage, are unaffected by water and moisture.



## Unmarked Police Cars: Good or Bad?

[Continued from page 100]

time. A car raced past at 85 or 90 m.p.h., in clouds of spray.

If we'd been in a marked car, that fellow would have slowed down. Not seeing us, he kept going, which is one argument against unmarks. Melvin swung over to the northbound lane. "We'll be lucky to catch him before he plows into Dover," he said.

**Scary work.** We rolled. Our speeder was gone from sight. The speedometer needle topped 100. A crossroad came flying toward us. Our siren went on and then off. Suddenly the crossroad was a mile back. This was scary work. For the first time we wished for a marked car, with big red lights. We thought of what a trooper had said: "In a fast chase your stomach turns over. You become emotional. It's hard not to take it out on the fellow you arrest."

Then we saw him far ahead.

Now Melvin had to make a decision: Slow down, pace him a while, and "get a clock on him"? And maybe let him get into Dover's evening traffic? Or sacrifice the "clock" and the conviction, but stop him for the safety of people in that evening traffic? He could be a drunk.

Melvin chose to sacrifice the arrest. He held his speed. Then we were on him, our headlights blinking for attention, our inside ceiling light on. Our siren shrilled.

Melvin picked up the microphone.

"Car 347 to Dover," he said.

"Go ahead," said Dover.

"Ten forty-one," said Melvin. "One mile south of Dover. White Chevrolet. Jersey." He read off the number.

**Coverage by radio.** Ten forty-one is code for "Leaving car. Cover me." The dispatcher will keep listening. If he gets no "10-42" signal in five minutes he will send other cars to help. This protects a lone trooper who, stopping dangerous criminals, might get jumped. Our speeder slowed down and stopped.

He was no criminal—just a very astonished New Jersey citizen. He claimed he was rushing his mother to a hospital for her nerves. Melvin said: "Well, sir, I can't arrest you because I don't know just how fast you were going. But I am advising you to do no more speeding in Delaware."

"And it's a cinch he won't," he com-

mented, back in Car 347. "Our halo will go with him right up to Jersey." He picked up the mike. "Ten forty-two," he said. "Ten four," drawled Dover, acknowledging.

Our man drove off. He was a very tame driver now. He'd remember for months the police car that came out of nowhere.

Clearly the plain car is a powerful weapon. What we were seeing in Delaware is also happening in many states. In Minnesota recently a "willful speeder" roared up a highway at 85 m.p.h. When he saw a regular police car he slowed

.....  
*Next Month: Homesick for underwater craft, an ex-Navy man has built his own three-man sub. It's powered by 28 six-volt batteries, is 25 feet long, weighs six tons, goes down 200 feet. You'll read about it in August PS.*  
.....

down and fell in line. The police car turned off and he immediately ran up to 85 again. He'd fooled the cops!

But he didn't fool a plain car traveling right behind him. This one nabbed him.

In Maine, a trooper in a plain car got a radio call for another trooper who was driving a state-police truck a mile behind: "An Olds 88 came up very fast, looked me over, and decided I couldn't catch him in this thing," the caller said. "So he passed me and took off. He's coming your way."

Moments later the Olds appeared in the plain car's mirror, and overtook it at better than 90. Chased and arrested, the driver was startled to find there'd been a trooper in that innocent-looking sedan.

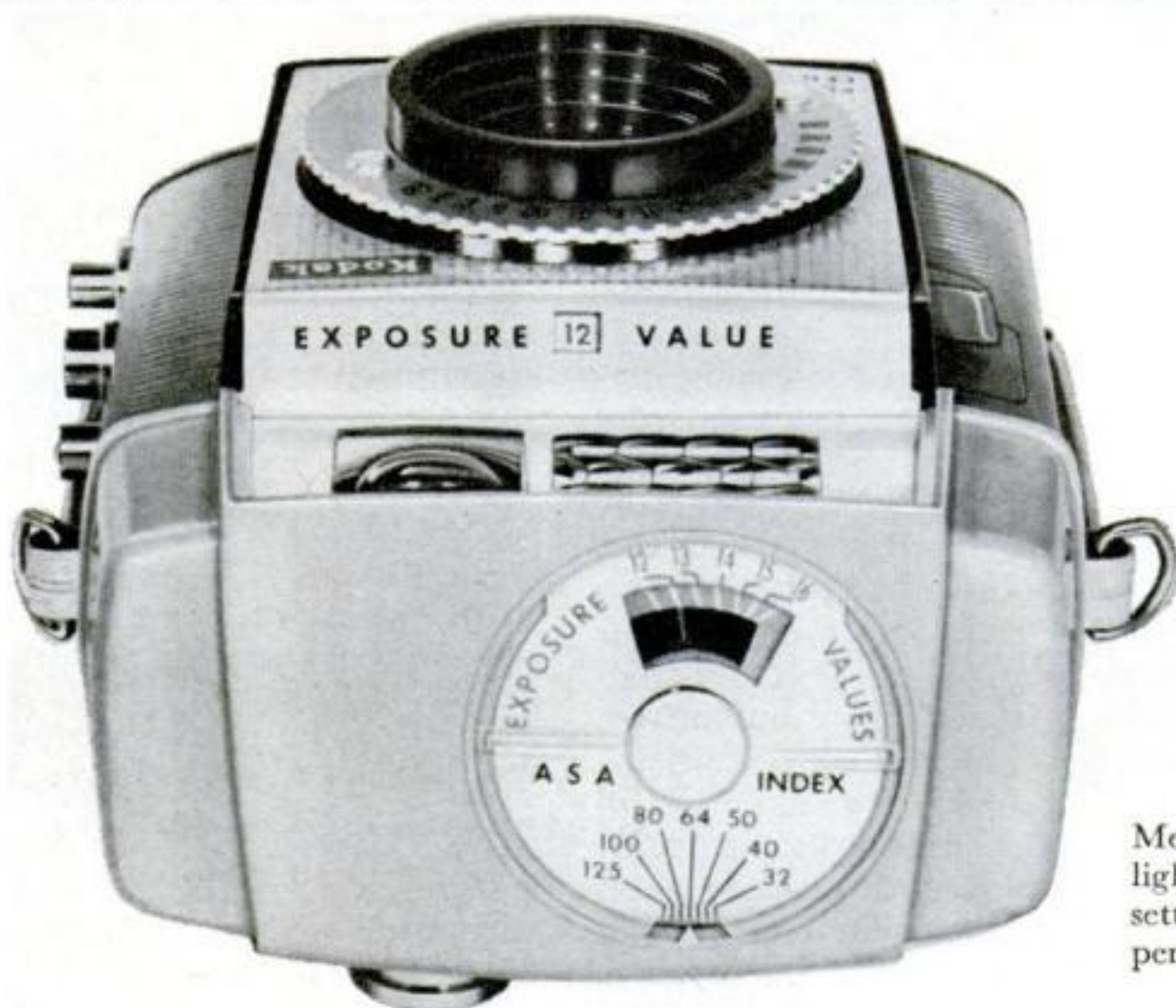
We came away from Delaware feeling that the unmarked car:

- Is a potent weapon against recklessness;
- Can be fairly employed, as it was in Delaware; and
- Could be seriously abused by lazy or dishonest police departments.

And what do cops themselves think of the idea? One thoughtful patrolman confided: "I think most of us would prefer marked cars. But this step has been forced on us. Someday, when people learn to take the road laws seriously, I hope we can go back to the old way."



# New Ideas in Photography



Measures the light, tells you the setting for picture-perfect exposure

## New Brownie Camera Has Electric-Eye Control

New production methods are making it possible to put deluxe-camera precision into electric-eye Brownie cameras—yet keep prices down to the traditionally low Brownie cost.

Kodak recently announced the low-cost

Brownie Starmeter Camera. Its photoelectric meter system is as sensitive as the meters on top-quality, high-priced miniature cameras. And the mechanism is rugged—built to withstand jolts as great as 50 G's.

Brownie Starmeter Camera eliminates exposure guesswork, gets 12 good shots on each roll of size 127 film. Yet it costs only \$19.95, or as little as \$2 down.

**Picture it now—See it again and again**



## Everything You Need But the Scene Is Packed in Kodak Gift Outfits

Americans like cameras—and *convenience*. That's why the big new gift trend today—for family, friends, newlyweds, young people—is the complete camera outfit.

This is a real trend—no fussing around, everything in one box, ready to start shooting! For a quick survey of the way people enjoy buying gift cameras today, visit your Kodak dealer and look at the beautifully gift-boxed Kodak and Brownie outfits. You'll find combinations that fit every gift need—from \$11.35 up.



**Most popular** outfit includes Brownie Starflash Camera with built-in flashholder, film, flashbulbs, batteries, instructions. All attractively gift-boxed for \$11.35.



**Home movie kit**—for movies indoors and out—contains new Brownie 8 Movie Camera,  $f/2.7$ , and a 2-lamp light bar with reflector flood lamps. \$32.50.



# from Kodak

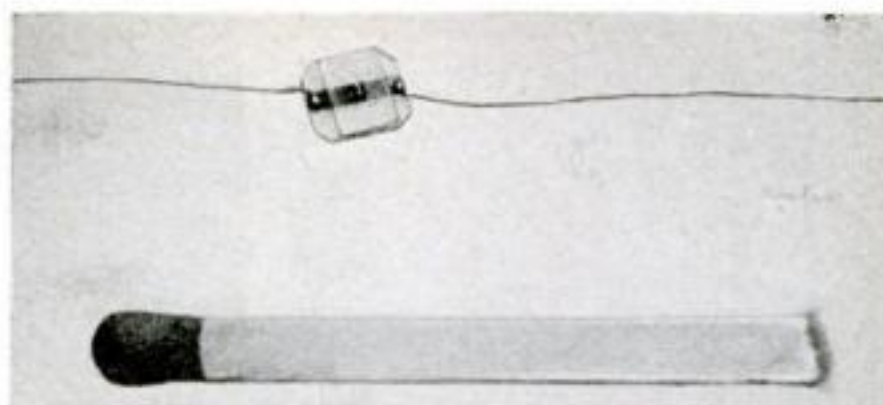
## Kodak Cell "Sees" Invisible Light, Lends Helping Hand to Weathermen

An ultra-sensitive Kodak heat-sensing device, first created for weapons use, is now helping meteorologists. Called the Kodak Ektron Detector, it forms the "eye" of two new instruments.

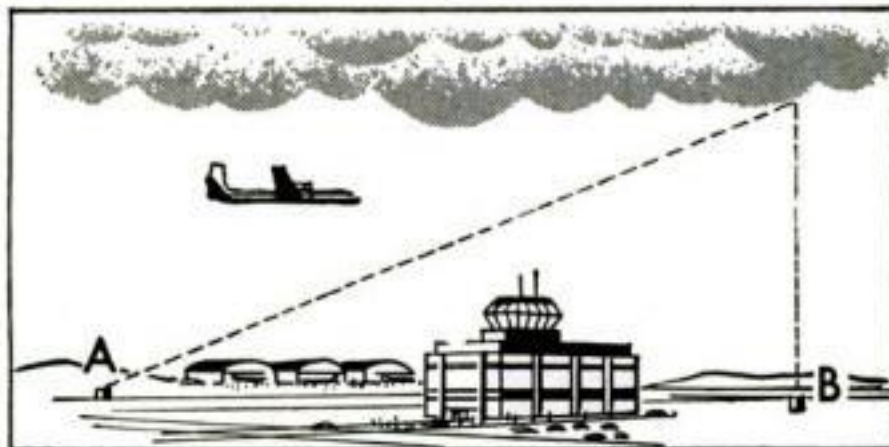
One instrument measures the height of clouds by bouncing a beam of infrared radiation off the base of a cloud formation. The echo is "sensed" by an Ektron Detector stationed a known distance away, and the cloud height is determined by triangulation.

The other instrument measures water vapor in the air. Scientists project two infrared beams of different wave lengths. The first is partially absorbed by water vapor, the second is unaffected. The difference in energy received by a Kodak Ektron Detector tells how much moisture is present.

The same kind of Kodak research that develops better ways to see and use light, leads also to finer films, filters, and lenses for amateur and professional use.



**Special bits of glass** are coated on one side with lead sulfide or lead selenide photo-conductive materials sensitive to invisible infrared radiation, to form Kodak Ektron Detectors. Picture above shows how Ektron Detector compares in size with a match.



**Used chiefly at airports**, the cloud-height measuring system is accurate up to 5000 feet. A rotating projector (A) bounces infrared light off the cloud base to the detector (B). The signal is fed to an indicator at the control tower for computation.



### New Brownie 8 Movie Light

Fits on top of the Brownie 8 Movie Camera, out of the way. Provides ideal "over-the-camera" illumination for indoor movies. Only \$5.95 (300-watt reflector flood lamps extra).

## Kodak Movie Camera, Only \$24.50! Uses New "Rabbit Ears" Light Bar

This all-new Brownie 8 Movie Camera makes sharp, clear 8mm movies with snapshot ease. And it's the lowest-priced movie camera in Kodak history.

Outdoors, you just dial a setting like "Bright Sun" or "Open Shade" or, if you prefer, use the *f*/stop settings. Aim through the enclosed optical viewfinder and shoot—it's that simple.

Indoors, you use a new compact light bar that attaches to the top of the camera for easy handling and ideal lighting.

Other features you'll like: the inch-wide shutter release eliminates fumbling, and the footage meter resets automatically after loading.

Best of all, however—it's yours for as little as \$2.50 down. Ask your photo dealer for a demonstration.

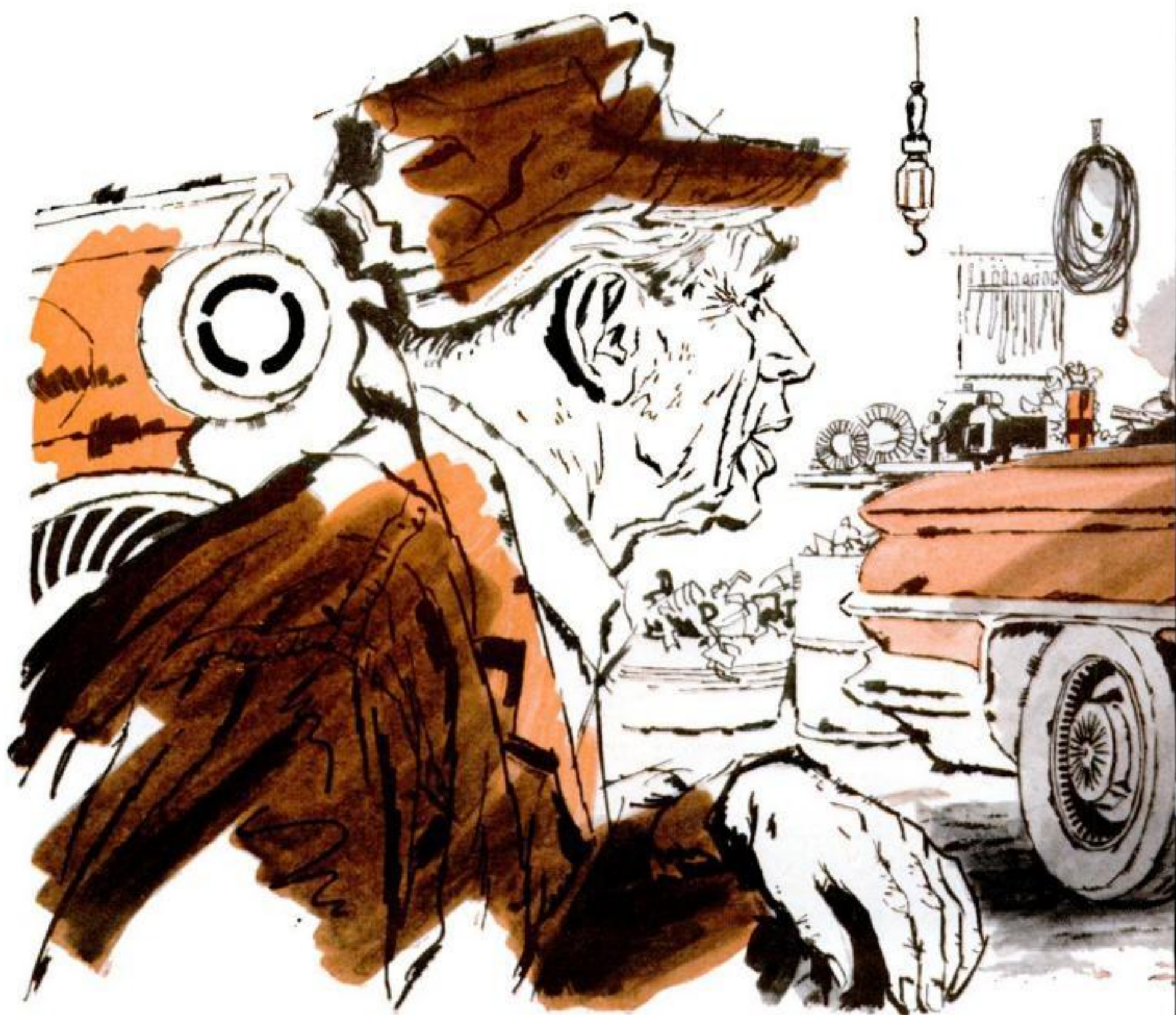
*Prices are list, include Federal Tax, and are subject to change without notice.*

**EASTMAN KODAK COMPANY, Rochester 4, N. Y.**

SEE KODAK'S "ED SULLIVAN SHOW" AND "ADVENTURES OF THE NELSON FAMILY"

**Kodak**  
TRADEMARK





## Gus Tricks a

**T**EN minutes? Mind it's no more," grumbled Silas Barnstable. "Time's money."

"So I've heard," agreed Gus wryly. "But working on that old wreck of yours is selling time pretty cheap, Silas."

The town penny-pincher grunted.

"Look," Gus went on, "you're headed for big repair bills with this antique of yours, and I don't want to hear you squeal when one comes. Turn loose enough cash to get a good car. You'll be doing yourself—and me—a favor."

Silas turned sharp little eyes on Gus. "And you just happen to know of a car

for sale, hey? With a bit for Gus Wilson and the Model Garage, no doubt."

Gus snorted in disgust. "You would figure it that way. Just sit and wait."

Ignoring Barnstable, Gus was busy at a bench job when the shop door slammed.

"Ted Griswold!" he said in surprise. "What brings you back, young fellow?"

The tall, dark young man grinned. "More luck than merit, Gus. The insurance company promoted me to district manager of our branch office here."

"Wonderful! Didn't take them long to find out how good you are, did it? You even look like an executive now."





*"Don't stand there gaping,"  
snapped the town's stingiest man.  
"Never seen an almost-new car before?"*

# Trickster

By Martin Bunn

"Come off it, Gus," laughed Griswold. "I'm the kid whose jalopy you used to patch up free."

"No more. I'll charge you double for all jobs on your Highbrow V-8."

"No kidding," Griswold said. "I do need a good car in this job. Fact is, that's something I want to ask you about."

"I don't sell cars, Ted. But we have some honest dealers in town."

"Don't mean that. The man I'm replacing is moving up to a big company job on the West Coast, flying out tomorrow, and can't take his car. He'll sell his \$1,500 equity for only \$600 if I finish

the payments. It's an almost-new hard-top with only 6,000 miles on it."

Gus nodded. "I think I know it—that'll be Ben Derringer's car."

"Right, and Derringer's sort of a quick, impatient chap. He said he'd hold the car until noon today, then sell it to the first comer."

Gus looked at the shop clock. "Past one now. Have you seen him?"

Griswold shook his head glumly. "Train was late. I reached his house at half past. The family's gone and neighbors told me he had just left to drive up to his summer cottage for some clothing.

CONTINUED

199



But nobody knows where his cottage is."

A SHOP chair squeaked as Barnstable shuffled to his feet. "Time's up, Gus. Can't wait while you stand jawing."

Seeing Stan Hicks, his young assistant, drop the hood on Barnstable's car, Gus knew the oil-fouled plugs had been cleaned. He scribbled a bill and gave it to Barnstable, who counted the exact amount out of a cracked wallet. Thoughtfully Gus watched his crankiest customer drive out.

"... thought you might know, from working on his car," Griswold was saying.

Gus snapped out of a reverie. "No, Ted. I think only the dealer has serviced that car. Did you check the Hall of Records to find where Derringer's place is?"

"Can't. It's closed Saturdays. I've asked all the realtors in town."

"Then see if you can find the gas station where Derringer deals," suggested Gus. "They might know. Cheer up—chances are he forgot he'd need the car to go upstate and counts on selling it to you when he gets back tonight."

"Thanks, Gus. I'll try the stations."

THE following Monday, just as Gus was thinking of lunch, an imperious horn sounded outside the big shop door, and a moment later a sleek hardtop sedan swept into the garage. But as it crested the concrete apron, Gus's sharp ears caught a dry *chunk* from beneath the car.

"I see you got it, Ted—and it sure is—" Congratulations froze on Gus's tongue as the car door opened and Silas Barnstable stepped out.

"Well, don't stand there gaping," snapped the town's stingiest man. "Never seen an almost-new car before?"

"Yes, but never you in one," admitted Gus. "Who did you rob, Silas?"

"I did make a good deal," said Silas,

rubbing his hands together. "Only 6,000 miles on it."

"Then this is Derringer's car."

"Was, Gus. I bought it legal."

A sense of outrage engulfed Gus. "Legal! You heard Griswold talking to me. You practically stole it from him!"

"Now that's pretty harsh language, Gus," whined Barnstable. "I took your advice, got me a good car. I knew where to find Derringer—his summer place is next to one I have a mortgage on."

"Well, you can take your car—and your business—somewhere else."

The old man flinched.

"Now wait, Gus. I ain't set against selling Griswold the car—if I can make a profit on it. But I already had it back to the dealer, same as Derringer did, 'count of that *scree-chunk* underneath. They said they put new shocks in for Derringer. Today they tightened the spring shackles—made me pay for it, too."

"Still clunks, doesn't it? Maybe you'll find this an expensive bargain."

A fine rivulet of sweat rolled down Barnstable's bony nose. "Give it a road test at least, Gus."

Gus glared at him, then shrugged. "Wait till I give Stan some orders."

### Where'd it come from?



THE WEEK: Dividing time into seven-day intervals was a scheme many ancient civilizations used. The days get their names from the seven heavenly bodies—each associated with a god—that were thought to revolve around the earth.

Sunday: *Sun*; Monday: *Moon*; Tuesday: *Mars* (Anglo-Saxon "Tiw"); Wednesday: *Mercury* (Woden); Thursday: *Jupiter* (Thor); Friday: *Venus* (Frigg); Saturday: *Saturn*.

FAR back in the shop, Gus gave Stan low-voiced instructions, then returned.

"When does it make that racket?" he asked Barnstable, getting in.

"Any time I go up a driveway or hit a dip in the road."

Gus put the automatic drive in reverse and backed out. As the rear wheels climbed the apron slope, an unnerving clunk came from under the car. It was briefly repeated when the car climbed down the outside. Gus shook his head thoughtfully.

"Bad, hey?" asked Barnstable.

Grim-lipped, Gus said nothing. He drove slowly a block or two. When he coasted up a driveway slope to make a



**192.001 MPH FOR STRAIGHTAWAY MILE!**

# ANOTHER WORLD'S RECORD SET WITH CHAMPION SPARK PLUGS!

**It's further proof that every engine  
does its best with Champions . . .**

Slashing across the surface of Lake Washington with its Rolls-Royce engine screaming a song of speed, the unlimited-class hydroplane *Miss Thriftway* sets a new

World's Record for the Straightaway Mile—192.001 miles per hour!

Again a World's Record has been set with Champion spark plugs.

In both inboard and outboard marine engines, Champions are the plugs that set most of the records, and win most of the races. In 1959, for example, all 11 winners of the National Outboard Championships were powered by Champion spark plugs. Also 8 out of 10 winners of the '59 National Stock Outboard Championships—plus 13 of 14 winners of the '59 National Outboard Association Championships!

You may never want to try for a record or run a race, but you do want dependable power from your engine. And Champions deliver *all* the power built into any marine engine. For racing, skiing, cruising or trolling, you can depend on Champion spark plugs.

DEPENDABLE  
**CHAMPION**  
MARINE SPARK PLUGS



CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO





U turn, there was no noise. But it occurred again on the Model Garage apron.

"What'll it cost?" asked Barnstable.

Gus shook his head. "The way you feel about repair bills, Silas, I don't want to take on this job."

As he and Barnstable stepped from the car, Ted Griswold sauntered up. "Hello, Gus. Came to tell you I still need a car. This one for sale?"

Gus grunted, "If so, don't buy it."

Barnstable drew Gus away. "What is it, Gus? A bum rear end, or is the automatic transmission shot?" he whispered.

"I'd rather the dealer told you, Silas. No charge for the road test."

Gus walked off. Barnstable hastily looked about for Griswold. "Hey, young fellow. Want to buy this car?"

"Hold it, Ted," warned Gus. "I'll

"Okay by me," said Griswold. "It's a swell car—whatever's wrong with it. Is it the clunk I heard when you drove in that scared him into selling?"

"Right. Sounds loudest in cars having automatic transmissions, because even slight seepage of transmission fluid at the rear seal can wash the lubricant out of the drive-shaft yoke."

"The what?"

"The splined-and-grooved coupling on the front end of the drive shaft. When the car rides over a bump, those splines slide in and out of matching grooves in the transmission. Look."

Gus jounced the back of the car up and down on its springs. "Not a whisper now, or when you coast over a rise or dip. But when the engine's pulling and drive torque loads the splines, they bind and then break free with that noise you heard."

"So that's what outfoxed Barnstable. And why Stan phoned me to come buy the car, no matter what you said about it."

"Sure. All I have to do is drop the shaft and pack the splines with viscous grease." Gus chewed his lips. "I didn't tell Silas it was an expensive job; he just naturally thought so. And after what he'd done, it seemed only fair to let him. At that, it was a dirty trick, and I'm going to tell him. Since he made a few bucks, he can't complain much."

"Nor can I, and he's welcome to the profit. You have my thanks, Gus."

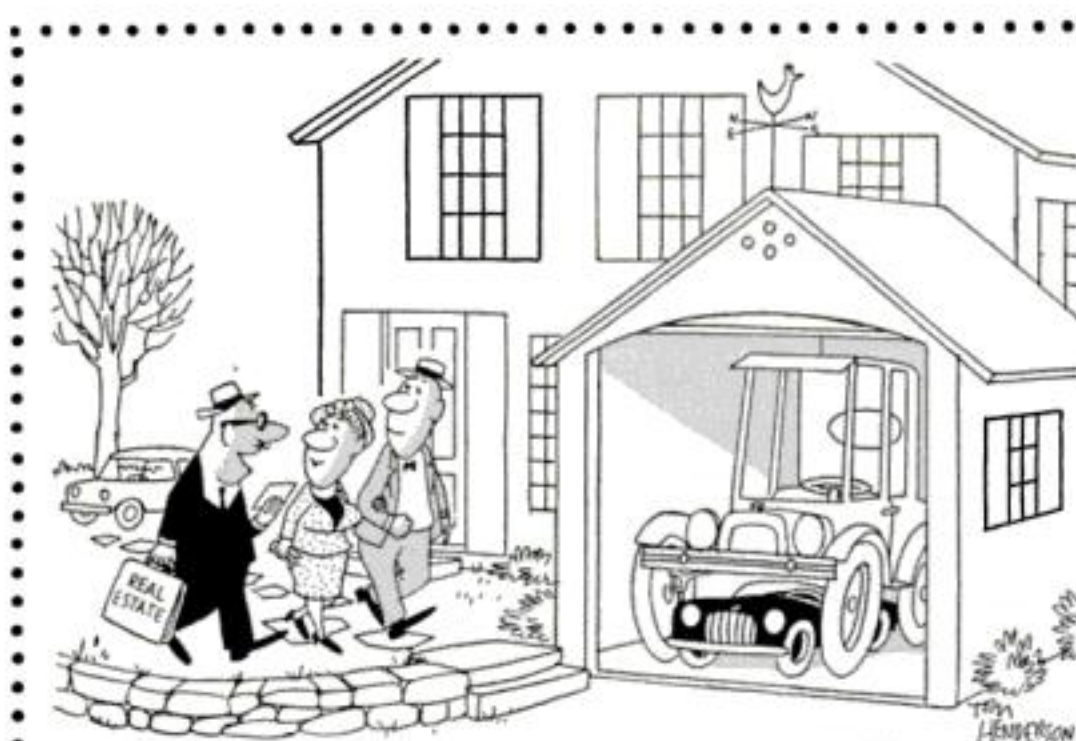
"Save them, Ted. He overheard you in my shop, and I missed the tip-off."

"To what he was going to try?"

"Sure. Silas gave me cast-iron proof when he was in such a big rush to get out. I should've guessed what he was up to and warned you."

"But how could you know?"

"Because," said Gus, "that was the first time Silas ever paid a bill of mine without an argument."



"... and it's got a two-car garage."

charge you just as much to repair it as I would Silas."

Griswold nodded, withdrew into muttered conversation with Barnstable.

TEN minutes later, Barnstable shuffled out. Griswold approached Gus, smiling.

"I saw Derringer that night; he'd already sold it—for \$550. I paid Barnstable \$600."

Gus chuckled. "Leave it to Silas to turn a profit somehow, every time!"

## NEXT MONTH: How to Buy a Car . . . in the Soviet Union

*How many months' wages does it cost the average Russian? How long must he wait? How about service, trade-in, resale? Harry Walton, back from car-hungry Russia, tells you—in August PS—about the Red red tape Ivan goes through to get a car.*



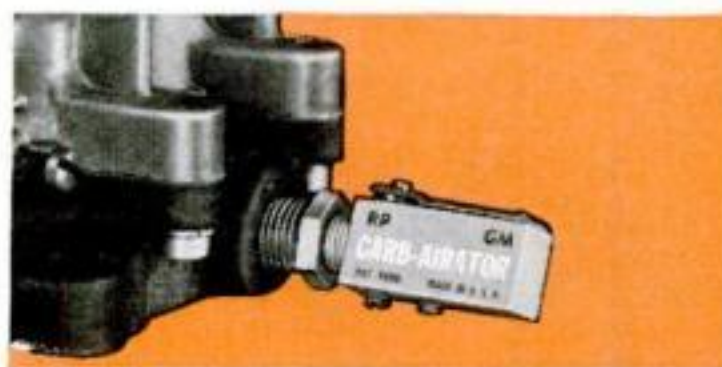
# **STOP STALLING**

## **BECAUSE OF HIGH UNDERHOOD TEMPERATURES**



### **SEE YOUR ROCHESTER-GM CARBURETOR SPECIALIST**

Stalling is always annoying, and sometimes downright dangerous. You can easily stop the kind of stalling that's caused by excessive underhood heat. Just let your expert Rochester-GM specialist install a Carb-AIRator on your car. This low-cost device is a hot idle compensator that fits *all* cars. It cures stalling, hard starting and rough idle caused by temperature build-up under your hood, winter and summer. Rochester-GM engineers designed it to meet and beat such conditions. Installs in a jiffy and saves you time and trouble. Rochester Products Division of General Motors, Rochester, New York.



Small, rugged Carb-AIRator is easily installed in either carburetor vacuum take-off or intake manifold.

If quality service is your business, ask your UMS distributor about Carb-AIRator and the other fast-moving items in the top-quality Rochester-GM Service Line.



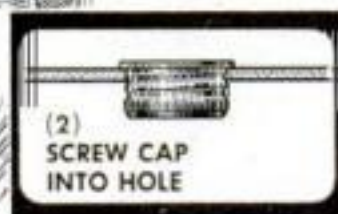
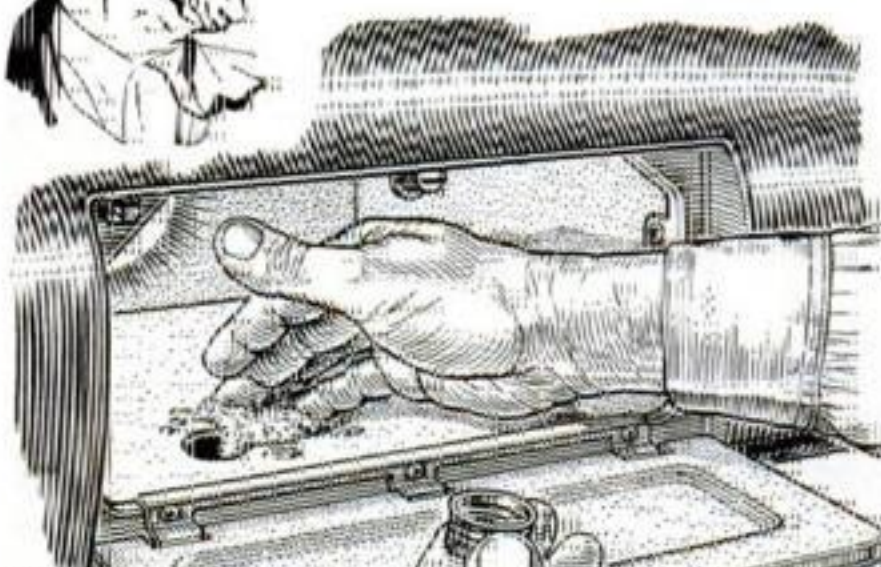
# **ROCHESTER CARBURETORS**

America's  
number one  
original equipment  
carburetors

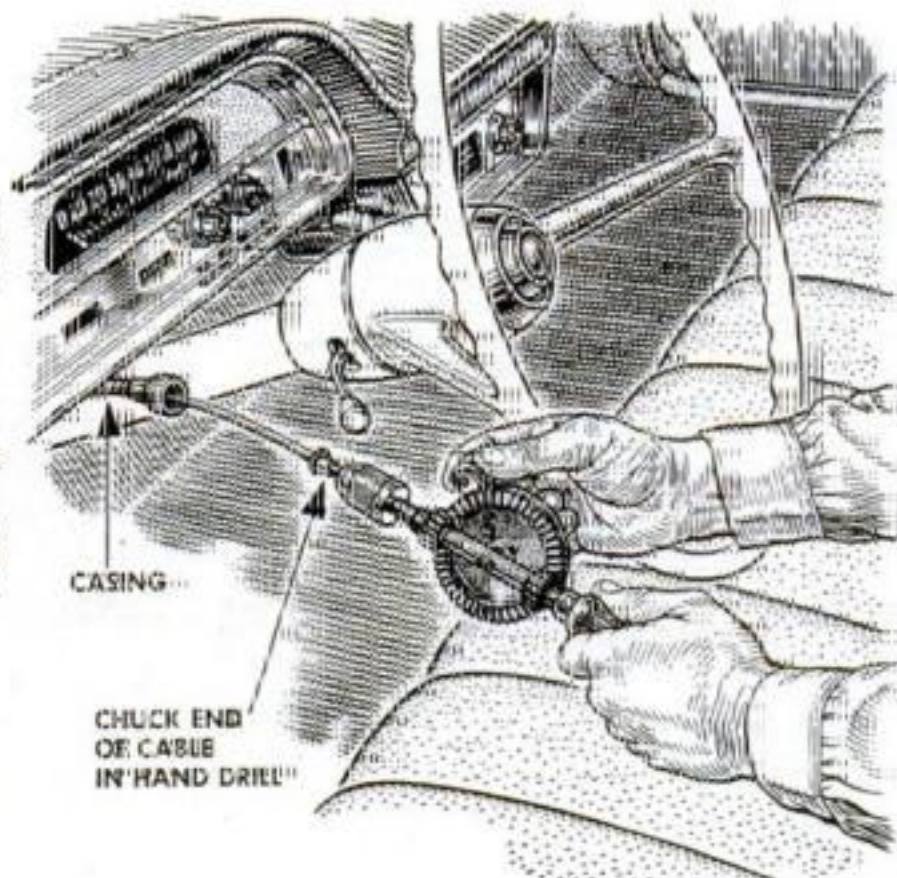




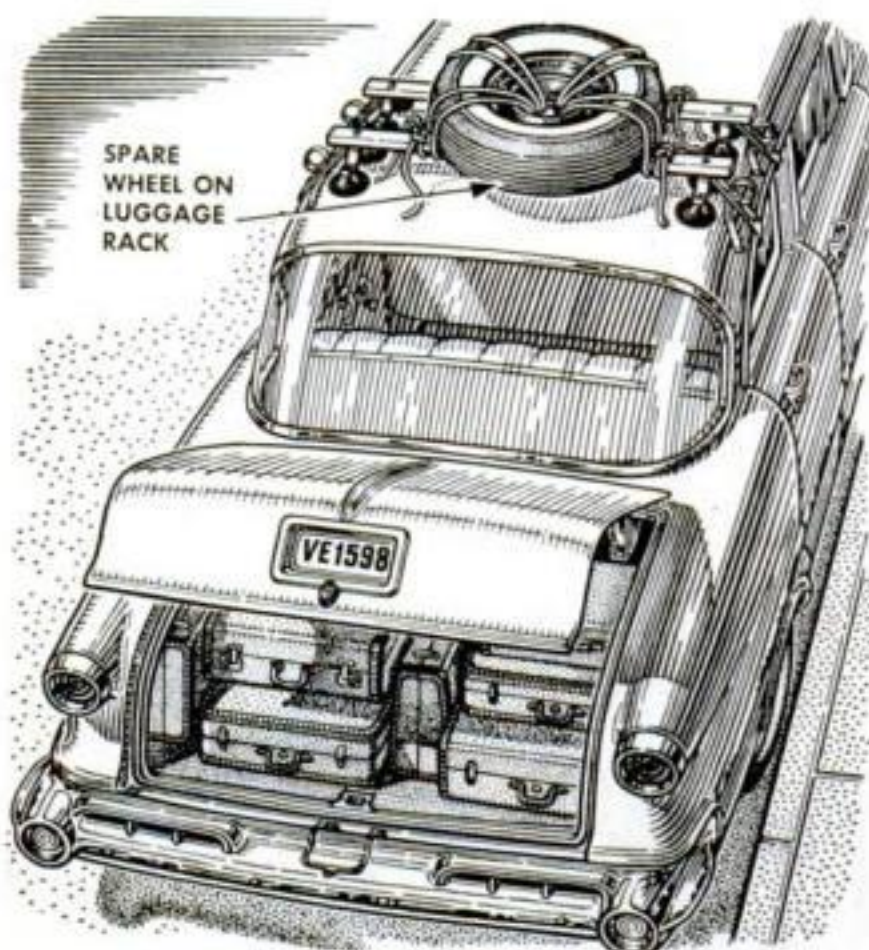
## Hints from the Model Garage



**Handy cleanout.** For easier cleaning of his glove compartment, one motorist has cut a hole in the bottom and fitted in a screw cap from a can of liquid wax. For cleaning, he removes the cap, sweeps dirt into a bag below the compartment.



**Turn in that cable.** It's usually difficult to slide a newly greased speedometer cable back into its casing. The job is easier this way: After starting the cable, chuck the end in a hand drill. Then turn the cable as you shove on it.

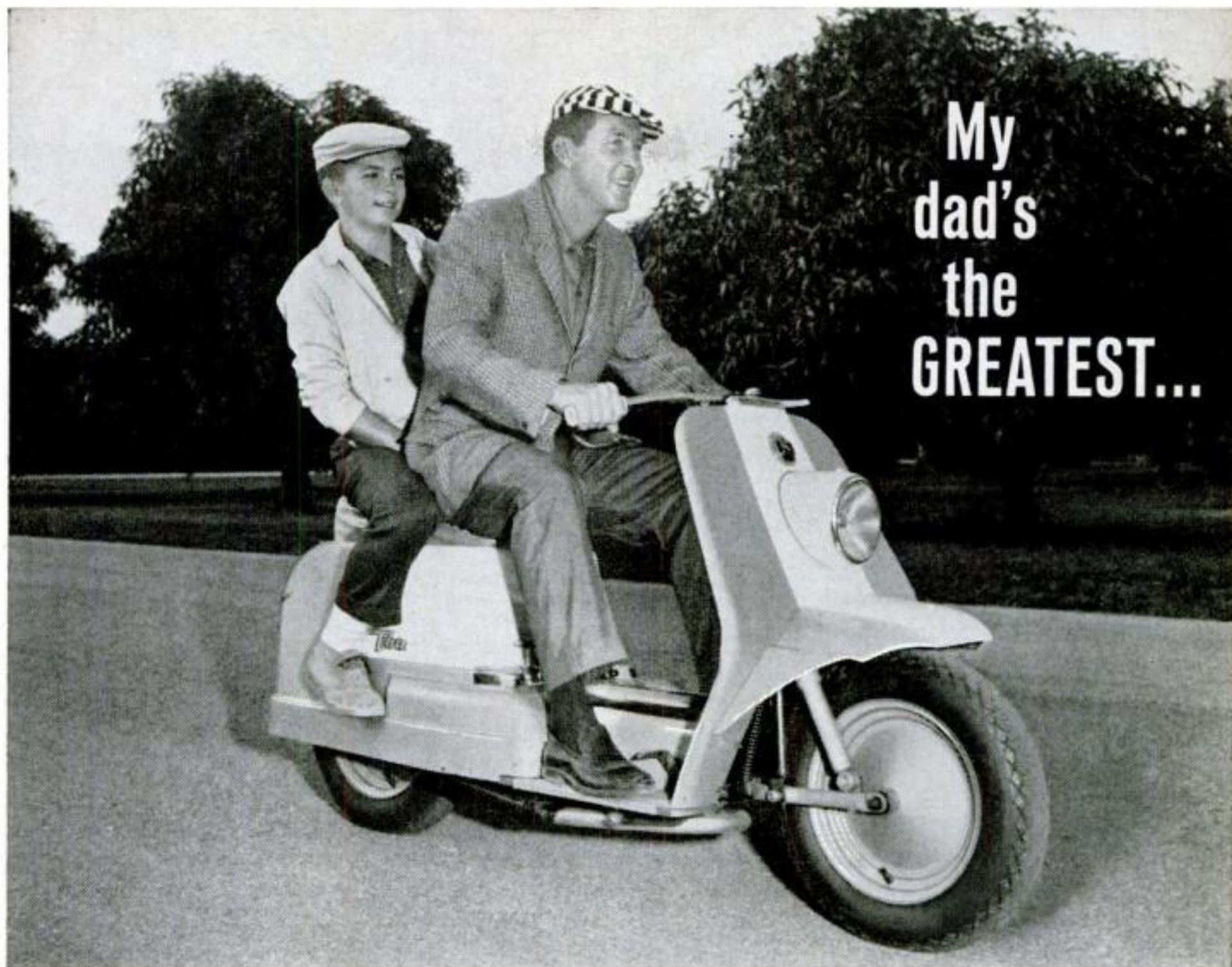


**Touring tip.** Said a lady passenger: "Since rain won't hurt the extra tire, why not put it on top of the car and use the whole rear deck for our suitcases?" A sensible idea—the bags are protected and the tire is as accessible as ever.



**Distress signal.** One car owner has made his own warning signals for use when he is forced to stop along the highway after dark. The picture shows how. Mailing tubes covered with reflective tape are slipped over the rear antennas.





My  
dad's  
the  
**GREATEST...**

## and so is my new HARLEY-DAVIDSON **TOPPER**

Like father, like son... happy with the new Topper.

What a ride — gentle as a billowy summer cloud... with dual suspension and large foam rubber saddle. Dependability — plenty of get-up-and-go. Automatic *Scoot-away* transmission—no shifting or clutching needed.

Dad is sold on safety features like the large diameter wheels and sure-stop front and rear drum brakes. Tells everyone about Topper economy — up to 100 miles to the gallon.

Mom's a Topper fan, too! She likes its good looks: sharp, clean

lines molded in tough beautiful fiberglass... two-tone color styling... chrome-plated instrument panel.

See your Harley-Davidson dealer. He will arrange a fun-filled demonstration ride. Or send in the coupon for literature.

HARLEY-DAVIDSON MOTOR CO.  
Dept. PS, Milwaukee 1, Wisconsin

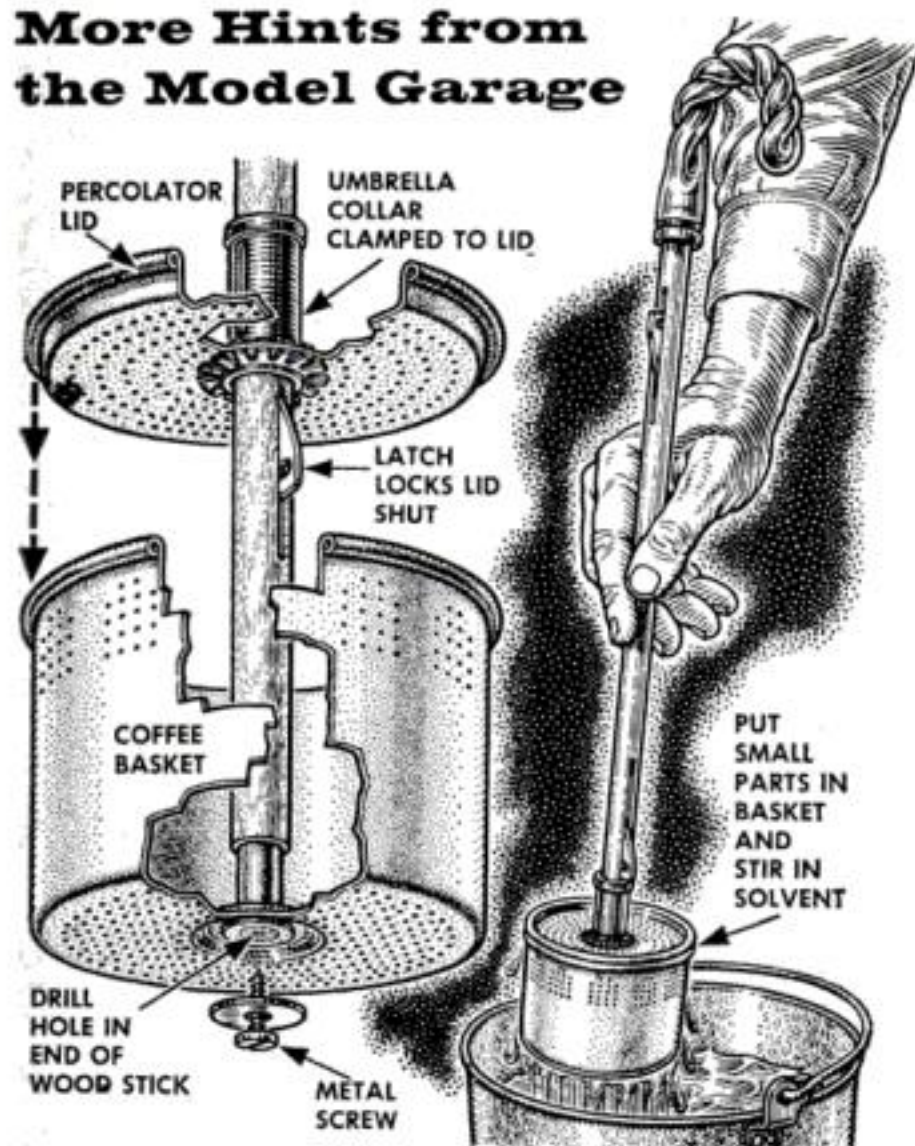
Send me more information on  
the Harley-Davidson Topper

Name.....Age.....

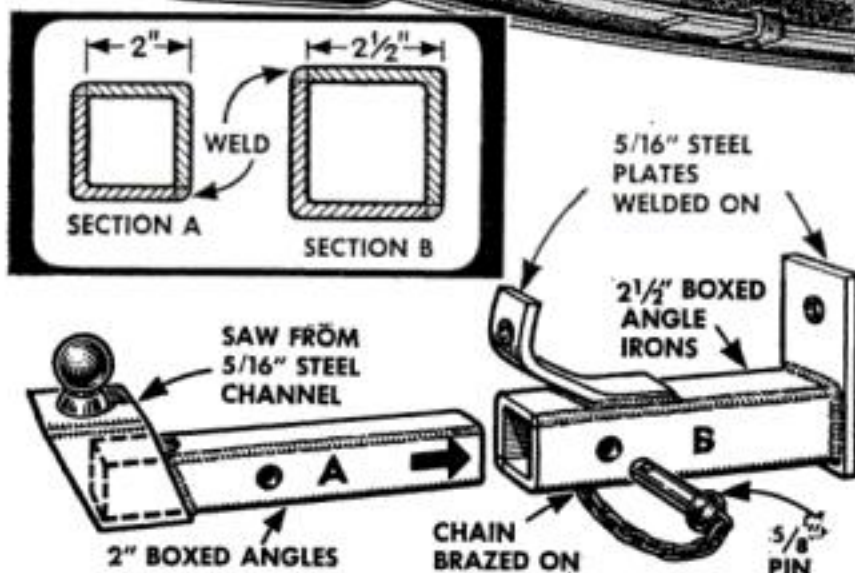
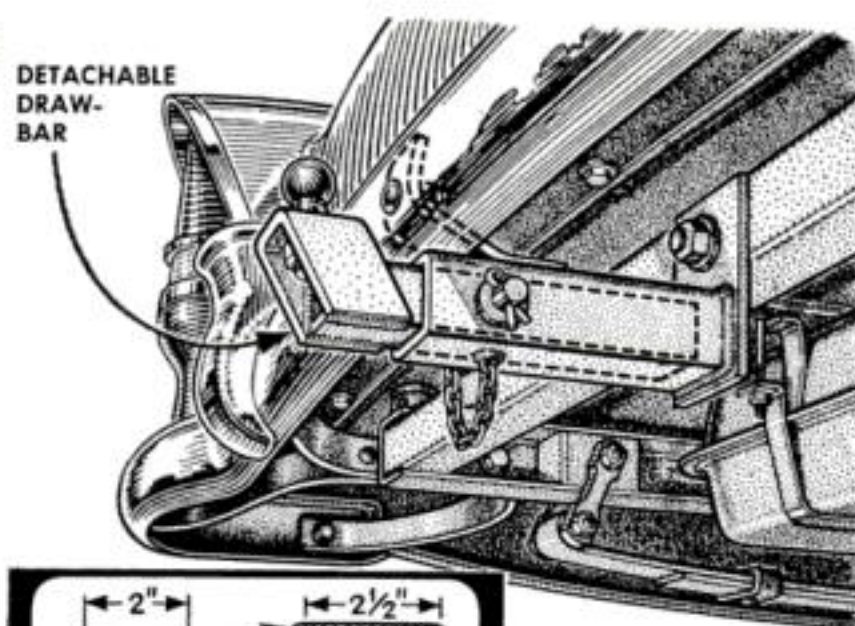
Address.....



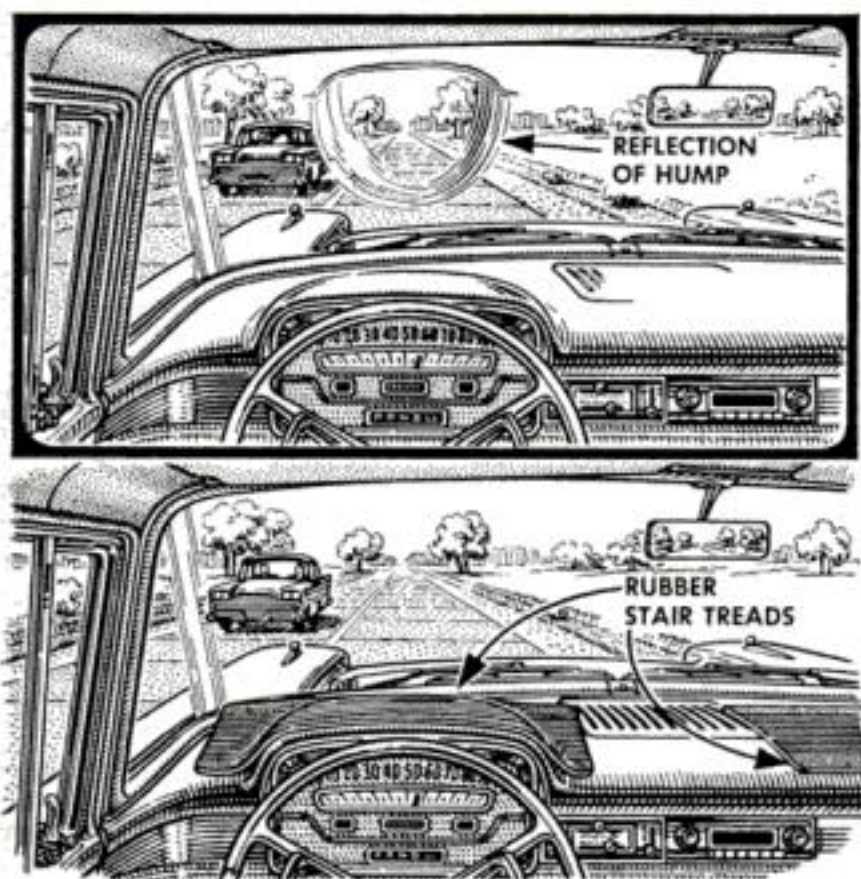
## More Hints from the Model Garage



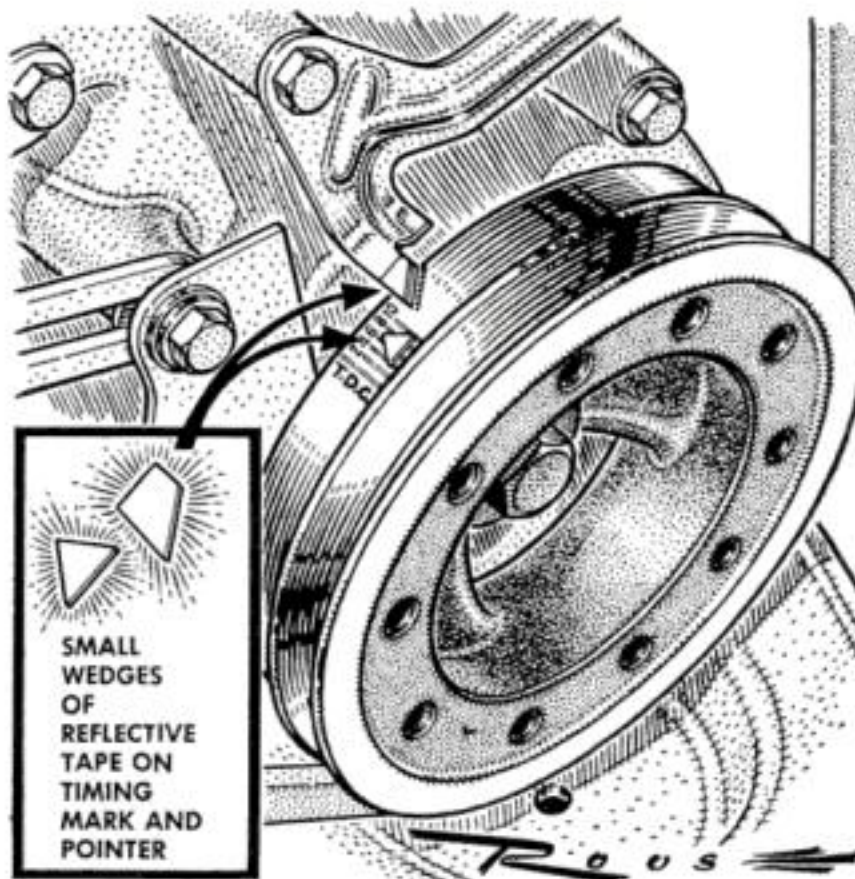
**Small-parts washer.** An old umbrella and the basket from a discarded coffee percolator are the main parts used in making this small-parts washer. Remove the stays from the umbrella collar and fit it into the percolator tube.



**Detachable hitch.** Here's a trailer hitch that's right there when you need it, but that's easily removed when you don't. It's best to weld up section B first, then use this as a form in making section A so that it slips nicely into B.



**Overcoming glare.** On some cars you get a disturbing sun reflection from the hump of the instrument panel. Draping a rubber stair tread over the hump is one way of overcoming this. A second piece can be put on the passenger side.



**A timing tip.** Ignition-timing marks often become so dirty that you have difficulty seeing them. When this happens, cut small wedge-shaped pointers from adhesive reflective tape (red is excellent) and press them into place.





SAE MOTOR OIL VISCOSITY GRADE CLASSIFICATION SYSTEM

SAE VISCOSITY GRADE NUMBER	VISCOSITY, SAYBOLT UNIVERSAL SECONDS			
	AT 0° F.		AT 210° F.	
	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
5W		4,000	39	
10W or	6,000	12,000	40	15
20W or	12,000	48,000	45	20
20		48,000	45	58
30			58	70
40			70	85
50			85	110

Viscosity is measured by the time required for 60cc of oil in the Saybolt Viscosimeter Tube to flow through a standard opening, at a given temperature.

## What viscosity really means

Viscosity is a liquid's *resistance to flow*. It varies among different liquids, and increases to some extent as temperature drops.

In the United States, the viscosity of oils is usually determined with a Saybolt Universal Viscosimeter. It simply measures the time in seconds required for a given quantity of oil to drain through a standard hole at some fixed temperature. The SAE Motor Oil Viscosity Grade Classification System (see chart above) uses these viscosity seconds to specify the viscosities of its SAE 5W, 10W, 20W, 20, 30, 40 and 50 motor oil grades. The first three "W" grades are especially suited for winter use.

The viscosity of your motor oil is very important. When you start your engine at a subzero temperature, a heavy, slow-flowing oil takes much too long to reach engine parts and permits more wear than thousands of miles of driving.

However, a light, fast-flowing winter oil

does not have enough viscosity to prevent wear at high summer temperatures. Thus, with ordinary oils, it is necessary to change grades seasonally.

Havoline Special 10W-30 Motor Oil is the wisest choice for any car owner because it magically combines the fast-flowing property of the Winter SAE 10W grade with the high temperature, wear-preventing quality of the Summer SAE 30 grade. It's the ideal, all-temperature oil. Use it *in all seasons*.

In addition, Texaco's special refining and exclusive additives in Havoline Special 10W-30 prevent the harmful sludge deposits and varnish that are so prevalent with ordinary oils in today's stop-and-go driving.

The few extra pennies for this finest of motor oils is your best insurance against engine damage and repair bills. See your Texaco Dealer for a change to Havoline Special 10W-30 ...and change it *regularly*.

**Buy the best... buy TEXACO**

TUNE IN: TEXACO HUNTLEY-BRINKLEY REPORT/MONDAY THROUGH FRIDAY/NBC-TV

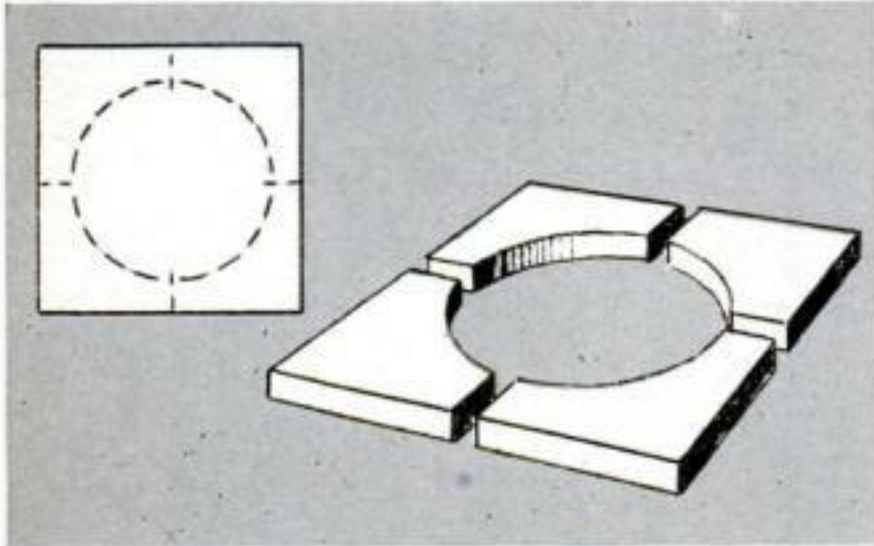


Copyrighted material



## Short Cuts and Tips

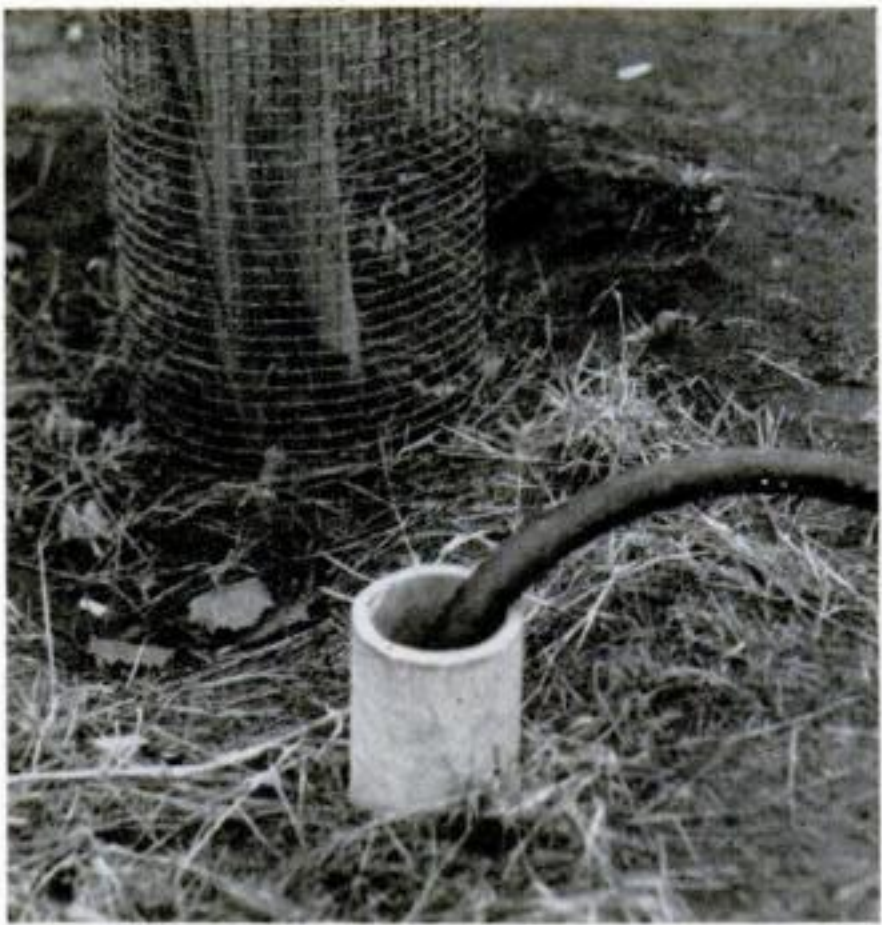
FROM PS READERS



### How to Make Shelf Brackets

IF YOU can't find shelf brackets small enough for a particular job, you can saw them out of scrap  $\frac{5}{8}$ " or  $\frac{3}{4}$ " stock. Cut a circle from a square of the stock with a coping saw or jigsaw. Then cut the remaining piece into four parts, smooth with sandpaper and drill for screws.—*Finlay Kerr, West Kirby, England.*

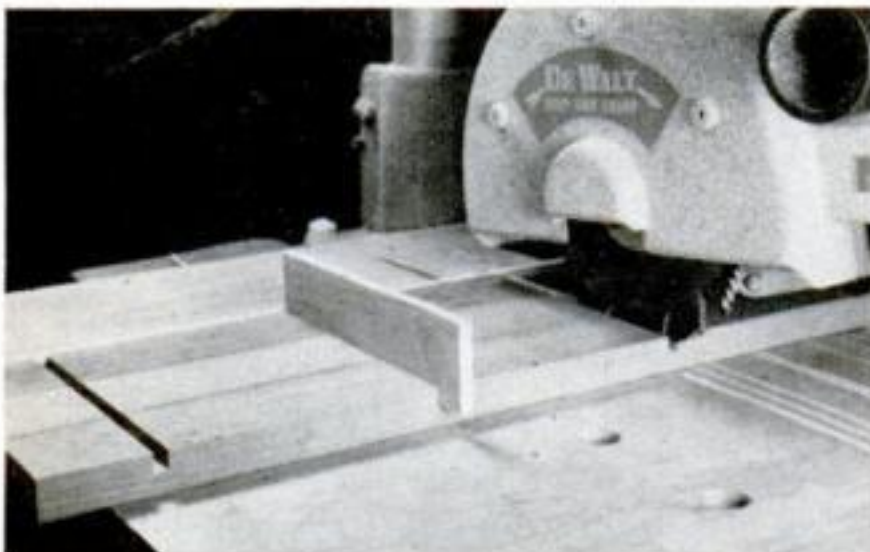
▶▶▶ WHEN a fluorescent starter goes out of order, you can often start the lamp temporarily. Just rotate the tube in both directions in the end holders as if you were screwing it in and out. You may have to twist it several times until it finally lights.—*D. E. Williams, Sanger, Cal.*



### Giving New Trees a Drink

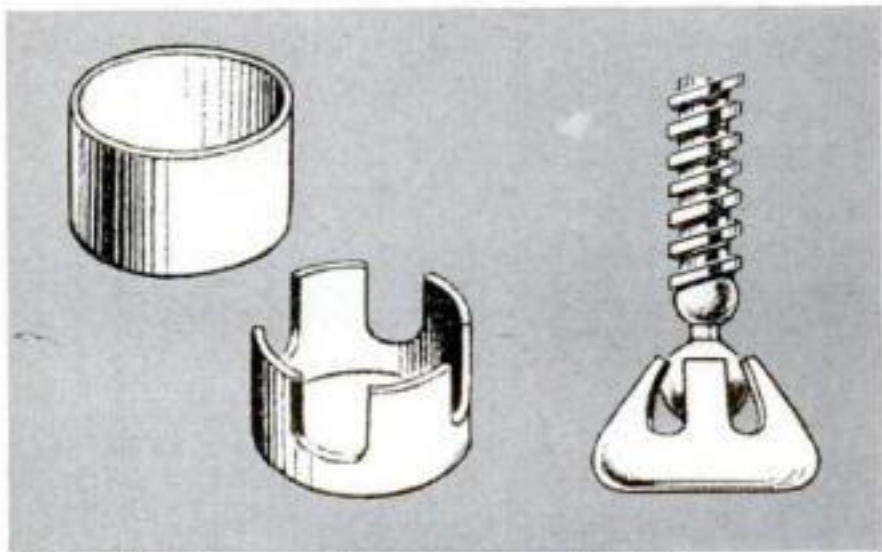
WHEN new trees and shrubs are planted at Coulee Dam National Recreation Area, a piece of drainage tile is placed vertically in the ground near the roots and filled with gravel. It lets water reach the subsurface without evaporation. When subirrigation is no longer needed, the section of pipe is removed.

▶▶▶ FINDING a small tear in the plastic seat covers of my station wagon, I patched it by melting on a square of clear plastic with a soldering gun. I also sewed a ripped seam with six-lb.-test nylon fishing line, using a curved upholstery needle.—*W. M. Watterson, Tampa, Fla.*



### Dadoes in Multiple Pieces

WHEN cutting a series of dadoes across several pieces of the same stock, you can make the job easier by aligning the first or second dado with a block fitted in it. Succeeding cuts on the two or more pieces will then be spaced accurately.—*R. J. De Cristoforo, Los Altos Hills, Cal.*

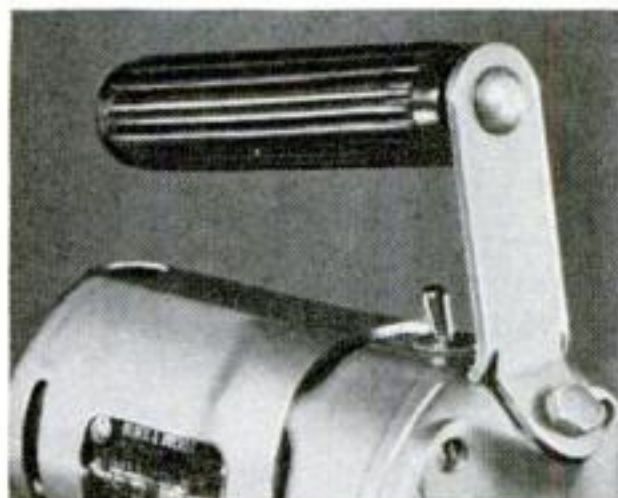
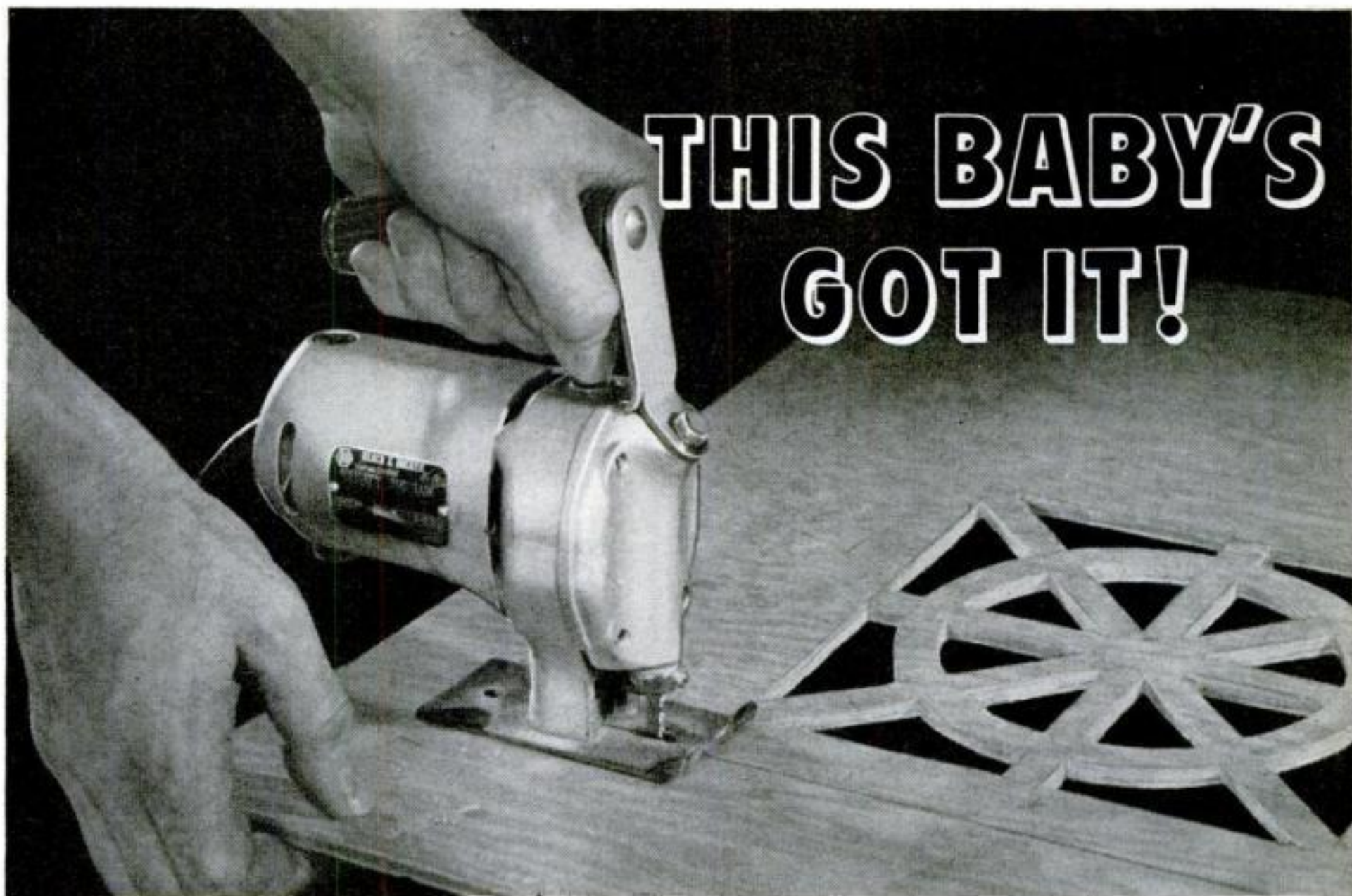


### Replacing Clamp Swivel

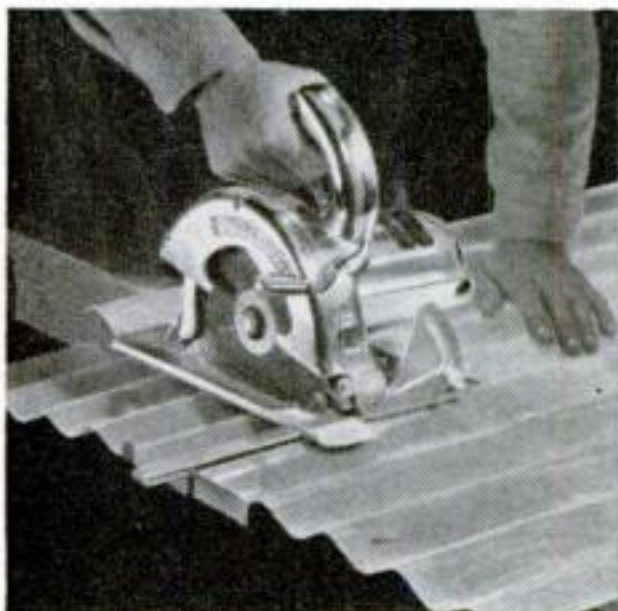
WHEN it becomes necessary to replace a broken swivel nut that covers a C or other screw clamp, try using a pipe cap that will fit loosely over the ball. Notch it to form four prongs, fit it into place and bend the prongs in to clinch them.—*Donald Crepeau, Calumet, Mich.*



# THIS BABY'S GOT IT!



**B&D'S NEW JIG SAW HANDLE** is in a class by itself! Designed to "feel good," perfectly balanced for sure control, fast work. *Plus* three-wire cable. Two *extra* blades *free*.



**HEAVY-DUTY SAWS.** Famous B&D-built motors. Saws from \$49.95. Saw Attachment for Drill, \$14.95.

**Improved B&D Jig Saw gives 25% faster cutting, better control, greater value . . . only \$29.95.**

Just out—and rarin' to go through practically any material with the greatest of ease: that's Black & Decker's improved Jig Saw! Does the work of a jig saw, sabre saw, keyhole saw and most band saw operations. Cuts straight, curved and intricate designs. Handles like a dream. Feels like a feather. Packs power to spare . . . up to 25% faster sawing. Maneuvers like a sports car.

What more do you want? A new low price? You've got that, too! This Black & Decker-engineered Jig Saw costs *only* \$29.95. Jig Saw Attachment for B&D Drill, \$14.95.



For free power tool catalog, write: The Black & Decker Mfg. Co., Dept. E-070, Towson 4, Maryland.



## Black & Decker®

WORLD'S LARGEST MAKER OF PORTABLE ELECTRIC TOOLS



## SAC's New Weapon: Treetop Bombing

[Continued from page 110]

"Those smooth file crescents are safe," McKay says. "The nicks that they replaced were not. Stresses concentrate at a nick—fatigue cracks may result—and the whole turbine may then come unglued at 14,000 r.p.m. But when we file the nick out smoothly, the blade is still safe. It's a lot cheaper than replacing the whole blade."

As we move along, you see other evidences of age and wear. McKay says it is impossible to keep the white undercoat of paint on a B-52. The paint is there to reflect the murderous heat of an H-bomb explosion. But it's not as tight as it might be when resisting the 600-m.p.h. air blast encountered on the runs. Repainting at frequent intervals is necessary.

"We have an odd new problem at these low levels we now fly," McKay says. "Bugs. Sometimes we come home with our windshield so clobbered by mosquitoes, May flies, and such that we have a hard time seeing the runway. Experiments are under way to work out a special bug cleaner."

*The obvious question*—isn't flying these B-52 bombers, after nearly six years of hard global practice, getting dangerous now? Not at all, says McKay. A bomber likes to fly. The safety record in B-52s is better now than it has ever been. "We can lose an engine on takeoff," McKay says, "even at maximum load, and get up without any sweat at all. And the bugs—except those on the windshield—have just about vanished from the B-52. It's solid, safe, and easy to handle. It's just a hell of a good airplane—even if it only flies 600 miles an hour." McKay then puts in a plug for the Pratt & Whitney J-57 engine. He says it is one of the most dependable jet engines in the world, and that he has complete confidence in it at any altitude.

On this happy note, let's crawl aboard for a ride over the Hangover Target Range. This is a 40-mile-wide pathway across the lonely forest of northern Maine, dog-legging down the bony mountains of Vermont, then turning west again to end with the target—Watertown, N.Y. We take off from Westover, climb to 30,000 feet going north, and call the Federal Aviation Agency controller in Boston for clearance to go down on the deck into

our penetration run—at tree-top height.

"This is Fireball One," McKay says to FAA. "Over Princeton VOR at 30,000. Request clearance to Hangover at 1700."

*The Boston controller* comes back almost instantly with a clearance. McKay chops power. The idea now is to make a combat letdown—roughly like a freight train falling off a cliff—as the boys would certainly do if they were making a real attack. Your ears dam up and the hatpin-in-eardrum routine begins. You mash your rubber oxygen mask against your nose, mashing your nostrils flat on your face, and blow back through the ear tubes. There's a squeaky snick, and the pain goes away.

Ahead of you is the flat, shined-steel plate of the Atlantic Ocean. It begins to tilt as the bomber starts its diving U turn. The coast of Maine wheels past the windshield at a 45-degree angle, steadies up dead ahead—another kind of ocean, blue-black this time, and made of trees instead of water. The bomber keeps diving until your toes begin to curl up inside your shoes. Your fingers itch to reach over McKay's shoulder and pull back on the yoke. He finally does it for you, and the B-52 hurtles off the ocean and over the pines, with a soft upward lurch from the beach thermal. In 20 seconds you have bugs on the windshield. McKay cusses gently. They aren't too bad—yet.

Up ahead are tall yellow crocuses of cumulus clouds, which have sprouted from the open fields over in Vermont where thermal updrafts have been rising in the hot afternoon. These aren't little bumps. In a few more minutes they will rock the bomber like haymakers.

*Now everybody is on the ball.* The navigator has the toughest job. He's too low to get much good from his radar. He must navigate the bomber, at 300 m.p.h., much as a civilian lightplane pilot navigates at 70 m.p.h. He must check the ground against his watch. And when he runs over a lake or a river, he must double-check it on his radar. Doping off, even for a second or so, can get the whole crew lost.

The pilot gives the order for everybody to tighten harness. The thermals are rushing upon the bomber. Soon it is



# YOU'RE BLINDING HER!



Even Your Dimmed Lights Glare In Her Eyes  
Will she lose control of her car?  
You'll know in a matter of seconds.  
That trunkful of luggage is responsible... the rear of your car is "down".  
Air Lift Air Springs will correct this overloaded condition... quickly and economically: Simply add air pressure for a smooth, safe and l-e-v-e-l ride with any overload. You'll never "bottom" on bumps, "scrape" on inclines, nor blind approaching drivers with your dimmed beams.

Over two million sets in use—See your dealer or write Dept. 137.



Patents in U.S.A., Canada and other Countries.

**AIR LIFT COMPANY**  
LANSING, MICHIGAN

In Canada: 18 Hook Ave., Toronto 9, Ontario



For rear coil springs For rear leaf springs  
AS LITTLE AS \$23.50



Loosens Rusted Bolts  
nuts, screws, "frozen" parts!

**LIQUID WRENCH**  
SUPER-PENETRANT

The super-penetrating rust solvent that quickly loosens rust and corrosion.

AT ALL HARDWARE  
AND AUTO STORES

RADIATOR SPECIALTY COMPANY  
CHARLOTTE, N. C.



**GENUINE ALNICO  
MAGNETS**

AMAZING, PERMANENT, NON-ELECTRIC. HIGHLY PRACTICAL.  
Conduct interesting experiments. Hundreds of uses. Retrieve valuable steel items such as guns, tackle from fresh or salt water; tools from tanks & drains. **GUARANTEED.** Try any magnet one week. Money back if you are not well-pleased.

No. S-710 (Wt. 53 oz.) Has pull of 225 lbs. on steel block... \$18.00  
No. S-625 (Wt. 70 oz.) Has pull of 125 lbs. on steel block... \$10.00  
No. S-575 (Wt. 18 oz.) Has pull of 75 lbs. on steel block... \$ 7.00  
No. S-500 (Wt. 13 oz.) Has pull of 50 lbs. on steel block... \$ 5.00  
No. S- 90 (Wt. 5 oz.) Has pull of 15 lbs. on steel block... \$ 3.50  
No. S-300 Kit of Flat Bars 5 pairs (10 Magnets)... \$ 3.00  
No. S- 47 Hot Pad Magnets, 10 for \$1.00... 50 for \$ 4.87  
No. S- 35 Hobbyist assortment of 8 magnets... \$ 2.00

Send M.O. or check. We pay postage. Sorry no C.O.D.'s.

MIAMI MAGNET COMPANY, 3240 N.W. 27th Ave., Miami 42, Fla.

If it's worth painting  
it's worth sanding...  
with sandpaper by



**CARBORUNDUM**

ADJUSTABLE **MITER BOX & CORNER CLAMP**

2 TOOLS  
IN ONE



Adjusts  
to any  
angle!

No. 44  
COMBINATION  
MITER BOX AND  
CORNER CLAMP

Holds the wood  
and holds your saw.  
Uses any handsaw  
for accurate cuts from  
0° to 180°. Full 3"  
capacity. Sides of  
joints exposed for  
nailing, gluing.  
\$2.75 ppd.

No. 33 Works the  
same as No. 44,  
but without saw  
guide attachment.  
\$1.75 ppd.

SUPER FILER  
No. 11



For both  
band and  
circular  
saws. Steel  
rollers  
give all  
teeth  
correct  
height,  
pitch and  
bevel.  
\$9.95  
ppd.

SEND FOR  
FREE Catalog.

A. D. McBurney, 5908 Hollywood Blvd., Hollywood 28, Calif., Dept.: S-70

Start a profitable business of your own

easy-  
to  
own!

NEW SHOP TYPE WELDER—The 180 amp.  
"Hustler" welds, cuts, burns holes, hard-  
surfaces, and heats metal for bending and  
forming. It's a complete welding package  
—including accessories, and meets REA  
requirements.



Get complete information...no obligation! →



...there's **BIG MONEY** in arc welding

NEW COMBINATION WELDER—The 200  
amp. "Power/Weld" furnishes DC current  
for welding and simultaneously provides  
110/220 v. AC power for running tools,  
pumps, lights, sprays, etc. Can also be  
used as an emergency power source.

for  
outside  
or shop  
use.

HOBART BROS. CO., Box P-70, TROY, OHIO, Ph. FE 2-1223

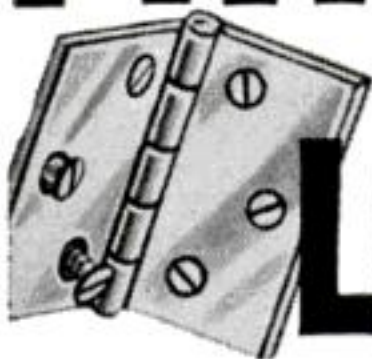




**QUICK!** Lubricate with famous 3-IN-ONE. Nothing like it for speeding up sluggish parts. Penetrates fast. Prevents rust.

**3-IN-ONE OIL**  
REGULAR • OIL SPRAY • ELECTRIC MOTOR

# HINGE



# LOOSE?

**FIX IT QUICK!**

Fill holes with dependable Plastic Wood. Won't chip or crumble. Ask for it by name.



For surest results always use GENUINE

# PLASTIC WOOD

Handles like putty—hardens into wood!

# PEEL PAINT OFF



Furniture



Floors



Boats



Woodwork



# KLEAN-STRIP

  
**PAINT REMOVER**

Fast • Clean • Non-inflammable

**THE KLEAN-STRIP CO., INC.**  
2340 S. Lauderdale, Memphis 6, Tenn.

**SAC's New Weapon: Treetop Bombing**

wallowing and lurching, but McKay is maintaining his rigid altitude clearance—even when the B-52 smashes through a white wall of rain and a dark cave of clouds housing flickers of lightning. The tail gunner—that unsung hero of the B-52—is now taking a hell of a beating. You, at the center of gravity of the bomber, are belted around a foot or so at a time. The tail gunner, far removed from the center of gravity, is like a man strapped to a monster diving board while a giant bounces up and down on it. It takes a rugged man to hack this mission, particularly at low level; if a man tends to get airsick, he'll certainly produce his

.....

*Next Month: A 2,000-m.p.h. airliner? You'll ride it sooner than you think, reports Eliot Tozer in August PS. Coast-to-coast time: 80 minutes.*

.....

lunch back there. And if something does happen, the tail gunner is strictly on his own. Nobody can crawl back through the clutter of struts and tubes, past the retracted wheels, to help him.

*The B-52 rounds the corner.* Out of Maine it bores down the Vermont ridges, tightly controlled from Boston—and by McKay and his boys. It takes a hard right toward New York State, and tears toward Watertown at better than 300 m.p.h. Before reaching Watertown, it rises steeply to 16,000 feet, for a "long-look" bomb run, clicks off its release point, and is scored by a Radar Bomb Scoring crew in an electronics van on the ground.

The folks in Watertown do not get mad at this racket. They know that it is our most potent way of keeping aggressors off our backs. They are proud to have the B-52s come over—and while some of them grumbled at first, they are not grumbling any more, now that they appreciate what is going on.

With the low-level attack completed, Major McKay does not go straight home to Westover. He goes up to Montreal and practices some *high-level* bomb runs. SAC has never been eager to pin all its faith to any one maneuver—even one as potent as this low-level mission—and they are not letting any part of their technique get rusty.



## Tunnel to Connect England and France

[Continued from page 69]

cutting tool. So the builders can dispense with compressed air, tunneling shields, and the laborious drilling-and-blasting procedure of traditional underwater tunneling.

Tunnel-boring mechanical moles large enough, and more, for the Channel job already exist. One tungsten-carbide-toothed type recently bored 29½-foot-diameter water tunnels at the Oahe Dam project in South Dakota. Makers of this machine and of similar ones, given test-bore samples of the sub-Channel chalk, reported to the Study Group that it was just what their devices liked to chew into. Their trials showed that a mechanical mole could drive a main Channel tube at an average pace of 1,475 feet monthly. Four machines, simultaneously advancing in pairs from each portal, could excavate the twin tubes in less than five years.

*The service passage* would be bored first. As it explored the rock strata, pressurized cement would plug any flaws exposed, to prepare the way for the big tubes. Rock from the larger excavations would be removed through the service tunnel, by pulverizing it and flushing it through hydraulic pipelines.

A 15-inch layer of concrete, the only lining needed for the main tunnels, would provide a smooth interior wall and seal the tunnel further against seepage.

Complete with railway equipment, the tunnel can be built for \$305,200,000, the Study Group estimates. Its traffic capacity is seen as ample for decades to come. It can carry at least 1,800 motor vehicles and their 4,200 passengers an hour, each way, plus passengers and freight in conventional trains.

An alternate engineering plan for building a rail tunnel, of equal capacity, is also offered by the Study Group. Instead of being bored through the sea bed, the tunnel could be laid in a trench on the Channel floor, by sinking and joining prefabricated sections of a single 45-foot-diameter tube with double tracks. It would take a beeline path across the Channel—a mile shorter than the route of the bored tunnel, which winds a little to follow the favorable chalk formation. It could be completed in four years instead of five. But it would cost \$315,120,-

CONTINUED

## HOW A FEW LOW-COST PARTS CAN GIVE YOUR CAR THOUSANDS OF EXTRA MILES!

**Which parts to replace is as important as when to replace**

Nobody wants to put out good money for an engine overhaul if there's no real need for one. But when key parts such as bearings are too far gone, your car engine can no longer operate efficiently.



### WHEN TO GET AN OVERHAUL

Know the signs, and you'll know the time. You'll probably notice that your engine has lost much of its original pep. Gas mileage drops off, oil consumption begins to get out of hand . . . and your engine may knock or misfire. Your car isn't ready to be retired yet. Do as fleet owners do. Treat your engine to a *complete* overhaul. Your car will purr like new again.

### WHICH PARTS NEED REPLACING

Get a first class mechanic, and *don't compromise on parts*. Parts represent the smallest portion of the cost. You'll probably need new main, connecting rod, and camshaft bearings. These bearings control the amount of oil that lubricates vital parts in your motor. And for bearings to give proper oil clearances, they must be manufactured to tolerances as small as .00025".

### FEDERAL-MOGUL MEANS LONG SERVICE

Your car engine is a precision mechanism, and bearings—main, connecting rod and camshaft—are the very heart of it. Yet it costs no more to use the best—Federal-Mogul. Ask any mechanic. *There's a Federal-Mogul engine bearing to fit every domestic and leading imported make of car.*



## FEDERAL-MOGUL SERVICE



Division of Federal-Mogul-Bower Bearings, Inc. • Detroit 13, Michigan





there's **MAN SIZE SPORT**  
when you're at the control of a

# Thimble-Drome

INTERNATIONALLY RECOGNIZED AS  
THE VERY FINEST IN POWERED MODELS

king  
size

## Comanche



Largest Plastic  
Model Plane on  
the Market!

Fully Assembled,  
Powerful Sportman .15 Engine,  
T-D Control Handle and  
Lines included.

An exciting challenge to fly—with more than 3 times the power of any previous ready-to-fly plane... yet completely controllable by anyone experienced in model flying! Almost yardstick broad, the 32" wingspan **COMANCHE** looms **BIG** on any flying field. Color striping and details are completely authentic from VHF antenna to landing gear covers! Even a king couldn't buy finer beauty, performance and dependability than this **\$2500** Sug. Ret. king-size aristocrat from Thimble-Drome craftsmen!

**PT-19**

## Flight Trainer

ALL NEW from Thimble-Drome!  
The finest flying plane in the  
.049 Ready-to-Fly class  
—bar none!



Wingspan 22"

Fully Formed  
Fuselage, Instant-  
Starting Babe Bee  
.049 engine, T-D Control  
Handle and Lines included.

For the seasoned flyers, here's flight performance they've never gotten before out of an .049... yet for the **beginner** it takes the roughest student landings without costly crack-ups! With T-D's **slip-together** rubber band assembly, its almost indestructible parts merely separate... reassemble in seconds to fly again! Unique engine-thrust adjustment gives you **time to think** about controls, brings instant flying confidence. Adjusts with experience right up through primary maneuvers. Get the Thimble-Drome PT-19 and join in the greatest sport of all—POWERED MODEL FLYING!



THIMBLE-DROME  
FUELS

Bring out the best  
performance from  
any engine.

Pint 95¢

½ Pint 50¢

Illustrated Catalog PSI  
on request.

**\$9.00** Sug. Ret.

At all hobby shops—most toy and dept. stores  
**L. M. COX MANUFACTURING CO., INC.**

World's Largest Manufacturer of Ready-to-Fly Planes and Engines  
P. O. BOX 476A • SANTA ANA, CALIF.

### Tunnel to Connect England and France

000, considerably more than the other. So the Study Group, while leaving a choice open, bases most of its figuring on a bored tunnel.

The dream of a Channel Tunnel dates back to 1802 when a French engineer, Roger Mathieu, proposed a submarine tube to Napoleon. By 1881 an actual start was made. The British and French each drove a gallery more than a mile out under the Channel—using early but effective tunnel-boring machines, of which today's mighty ones are direct descendants.

Then British fears arose of invasion by tunnel, and Parliament ordered the work abandoned. Repeated attempts to revive the idea were blocked by successive British governments.

A **turning point** came in 1955 when Britain's defense minister Harold Macmillan, now Prime Minister, acknowledged that modern weapons and aircraft invalidated strategic objections of the past.

With that, the dormant project came to life. Taking the initiative, a U. S. group called Technical Studies, Inc., sought international collaboration to sponsor a new Channel Tunnel project. The Americans found a ready listener in the *Compagnie Financiere de Suez*, a world-renowned canal company without a canal, since Egypt seized the Suez waterway in 1956. Interested too were the English and French Channel Tunnel companies of the 1881 venture—both still in existence, and still holding the rights to build a Channel tube. Joining forces, the four companies formed the Channel Tunnel Study Group.

Behind its present plan lie 2½ years of practical on-the-spot investigation by the Study Group—the most thorough Channel-tunnel survey ever made. By ultramodern methods of geophysical prospecting, ships charted the undersea rock strata through which a tunnel would pass. Frogmen brought up specimens of the sea bed. Test borings added samples from as deep as 226 feet below the Channel floor and 814 feet under the coasts.

**All possible ways** of spanning the Channel by rail or road were considered by the Study Group. Only one was found less expensive than a rail tunnel. That would be a \$291,800,000 two-lane vehicular tunnel, which could carry only



### **Tunnel to Connect England and France**

650 vehicles an hour each way—compared to the rail tunnel's 1,800. Its traffic capacity would become inadequate in the near future; its meager earnings in tolls would make it an unattractive investment, anyway.

A more capacious \$321,700,000 vehicular tube would still have less traffic capacity than the rail tunnel, and would be more costly. That would be largely because of the formidable and expensive problem of ventilating a road tunnel—which would require one or two artificial islands for "breather" shafts, and fans totaling up to 56,000 hp.

For other schemes, expense soared. A proposed rail-and-highway Channel bridge of 820-foot spans, with high sections to let the biggest ships pass, would cost a staggering \$506,800,000.

*Weighing the alternatives*, the Study Group finds a rail tunnel the best answer, at this time. (A future road tunnel might be built alongside it, with the aid of cross passages driven from it.)

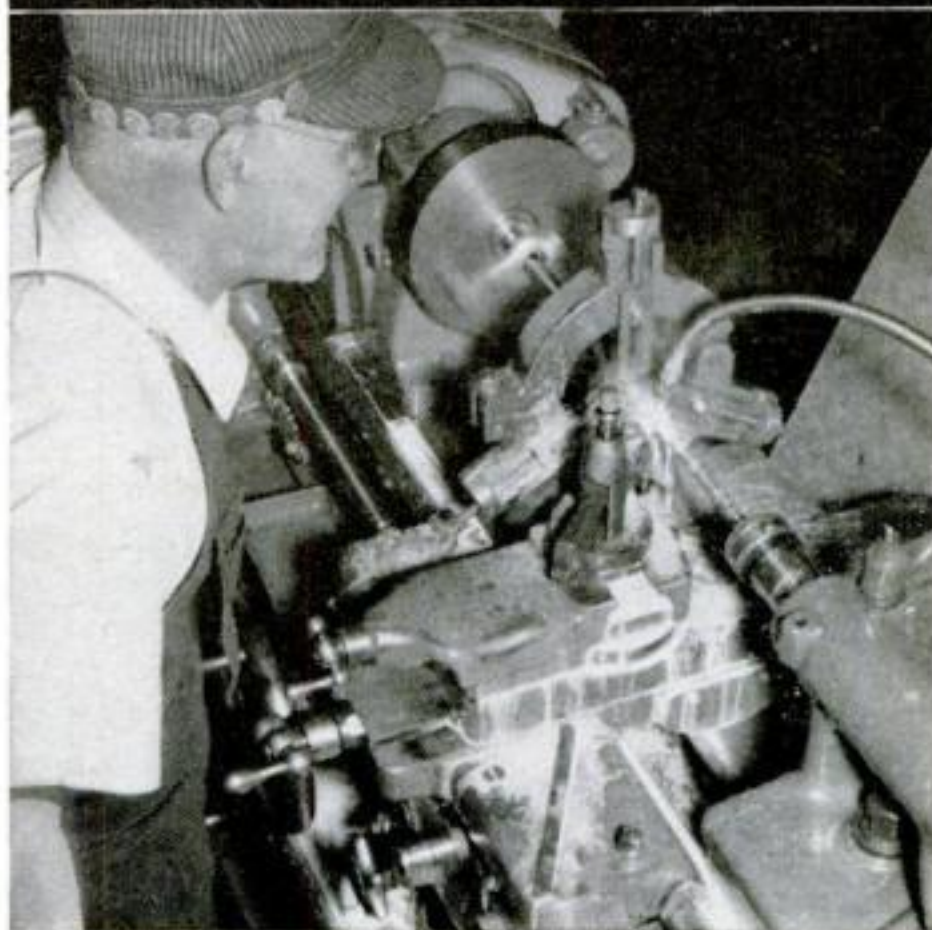
The rail tunnel can be built entirely with private funds, and can pay for itself in 35 years, the Study Group says.

Tolls, scaled accordingly, are to be \$16.24 for a motor car and its driver and \$4.48 for each passenger. This offers tourists a substantially lower fare than by sea ferry, and an even greater saving in time; crossing by boat, including waits at each shore, takes at least four hours. The tunnel trip is as fast as by air ferry and much less expensive.

If British and French governments approve the Study Group's plan, the next step would be an Anglo-French treaty setting up an international tunnel company and granting it the needed rights and concessions. Then the tunnel company would raise the money by issuing shares and bonds. It would foot the \$224,000,000 expense of building the "bare" tunnel from portal to portal. The rest of the cost—for track, rail terminals, rolling stock—would be borne by the British and French railways, which would rent and operate the tunnel under a long-term lease.

The Study Group expects the two governments to take some months to reach a definite decision, possibly by early 1961. Actual digging could begin the following year.

## **Built to Last**



## **South Bend 13" and 14½" Lathes**

Years mean nothing to these precision lathes, as they go on and on turning out accurate work at low cost with . . .

- Microfinished bearings with no metal-to-metal contact.
- Belt drive to spindle for vibration-free operation—no gear marks.
- Precision-cut gears and ground shafts for smooth power feeds.
- Rugged, rigid construction that will stand up under hard usage.
- Exacting workmanship by skilled craftsmen.

SPECIFICATIONS	13"	14½"
Swing over cross slide.....	7¾"	8¾"
Maximum collet capacity.....	1½"	1½"
Spindle speed range.....	20-940	15-875
Shipping weight, 7' bed.....	1760 lbs.	2089 lbs.

*Write for FREE 80-page catalog.*



Up to 36  
months to pay.

**SOUTH BEND LATHE**  
**SOUTH BEND 22, INDIANA**

*Building Better Tools Since 1906*



with sockets, **QUALITY** counts

## P&C SOCKETS

Last longer, let you work faster, easier



When you need sockets, buy good ones... P&C. Buy from the colorful P&C Merchandisers, 12,000 stores. Send 10c for tool catalog.



## P&C TOOL COMPANY

Box 5926, Portland 22, Oregon  
Warehouse: Schiller Park, Ill.

Subsidiary of Pendleton Tool Industries, Inc.

## EMERSON ELECTRIC

### PORTABLE WELDER High Capacity... Low Price

Ideal for farm, home workshop. Cuts, brazes, solders, welds. One man can carry... only 68 lbs. 6 welding heats up to 180 amps...  $\frac{3}{32}$ " to  $\frac{3}{16}$ " rod sizes. Write today for prices and receive **FREE WELDING SELECTOR GUIDE**... gives working data you need in seconds! Dept. W545



EMERSON ELECTRIC of St. Louis  
8100 Florissant • St. Louis 36, Mo.

### HOW TO PROTECT YOUR INCOME! Earn Extra Money With A Rapid

### SHEAR SHARPENER AND KNIFE SERRATOR



Easy to operate — professional-type sharpener does a perfect job in just 2 minutes on all types scissors and shears, including pinkie shears. Knife guide puts proper edge on any blade. Knife serrating attachment puts saw-tooth edge on hard or soft steel blades. Quick profits from homes, dressmakers, barbers, restaurants, hotels, butchers, etc. No experience needed. Big opportunities with this precision ball bearing machine. Has  $\frac{1}{4}$  h.p. motor. A money-making investment—write for **FREE FOLDER PS-10**.

**BEAVER MFG. CO.** P.O. BOX 434, 800 So. Isis Ave.  
Inglewood, Calif.

## Tanks That Walk and Jump

[Continued from page 54]

tions. The gears will prevent teeth-rattling jolts to the crew, he hopes.

The newly built model has four feet that look like square wheels. They overlap each other almost completely, two on each side of the body. They are moved up, forward, and down by a nightmare of levers requiring nine pivot points for each foot. The action is ungainly and inefficient: Two feet move together while the other two support the vehicle, but all four rest on the ground 40 percent of the time.

The object, however, is not grace but speed. And Professor Shigly is shooting for at least 20 m.p.h. Even half that would elicit hurrahs from the Army.

**Research from the ground up.** Vehicles with legs are only one small part in the research program of the Army's Land Locomotion Research Laboratory at the Detroit Arsenal. The Laboratory's civilian director is stocky, white-thatched M. G. Bekker, author of *The Book about ground vehicles (Theory of Land Locomotion)*. In it, he maintains that ships and airplanes evolved from a careful study of the machines in their elements—that is, in towing tanks and wind tunnels. To build good off-road vehicles, *their* element—the ground—must be studied. The big modern laboratory outside Detroit houses two huge "soil bins"—10-by-150-foot steel tanks full of dirt—in which wheel and track units can be tested. This fundamental work has already paid off in improved tank treads and an odd-ball wheel with a flexing tire.

The attempt to imitate animals is, Bekker concedes, a long shot. He points out that Nature is way ahead of man at engineering. Simply copying the motions she has devised won't be enough.

Even the stupidest animals have brains that delicately control muscle action and automatically compensate for missteps.

Muscles are better than any engine. They produce more power, weight for weight, and can adjust their output over wide ranges.

Bones, too, represent an ideal combination of weight, strength, and resilience.

A mechanical animal needs the same masterful combination of structure, power, and coordination. That's not easy. But the Army can't afford to miss a bet.



## Eight Feet of Space in Ten-Foot Car

[Continued from page 58]

ris 850s and scored a first in production cars. Twins under the paint (red, gray, or blue), they are identical products except for grilles and upholstery. You can buy either one stateside for \$1,295 (without heater) P.O.E. New York.

A full 10½ inches shorter than the Fiat 600, the 850 will nip into just 11½ feet of prime, rare American curbside space. It really does seat four comfortably, has 5½ cubic feet of trunk space, plus extra stowage room under the rear seat.

**The power package** is a four-cylinder OHV engine of 848-cc. (51.8 cu.-in.) displacement. Slightly on the long-stroke side (bore 2.48, stroke 2.69 in.), it puts out 37 hp. at 5,500 revs. The car's 1,288 pounds load it modestly—less than 35 pounds per horsepower, against 45 for the Volkswagen and 60 for the Fiat 600. The score shows in pickup (zero to 50 m.p.h. in 17 seconds) and fuel economy. Despite 10-inch wheels and an overall ratio of 3.765:1, the 850 delivers 40 to 45 miles per gallon.

The transmission, synchronized from second up, is built into the engine sump, with the differential alongside. Pour in 4½ quarts of oil and you've lubricated the whole works. This entire drive can be yanked out in just 20 minutes by removing 10 bolts.

**Look, no springs.** The load-carrying elements are oil-can-shaped rubber cones, installed under a load of four tons.

The unitized body is flat underneath except for a shallow tunnel housing the exhaust pipe. Ground clearance is six inches. On the trailing frame at the rear is an automatic valve set in the hydraulic-brake line. Up to 40 pounds of pedal pressure, hydraulic effort is equal on all four wheels. Tromp harder, and all extra pressure is valved to the front shoes, taking advantage of engine weight there.

**From the driver's seat,** the odd steering-shaft angle gives you a bolt-upright feeling. Close-spaced pedals have to be stepped on tiptoe. Getting out of the car is like stepping out of a bucket.

Give the 850 good marks, though, on maneuverability, road obedience, its 12-month warranty, and a tool kit that even includes a grease gun and thickness gauges for the weekend mechanic.

# HEFT A MAN'S HAMMER

ROCKET  
\$5.49

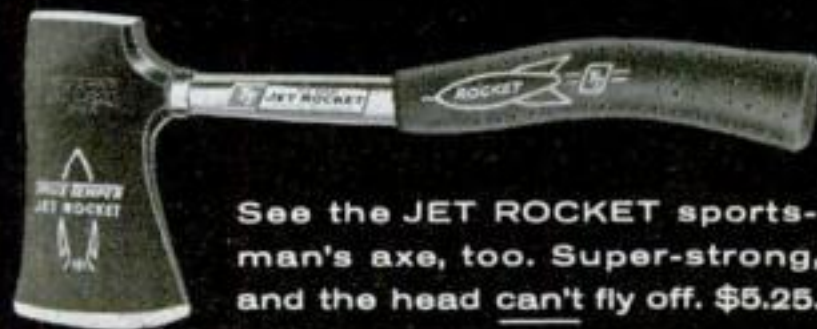
Heft a ROCKET.

It has a vitality all its own. Grip it. It's as secure in your hand as if it were gripping back. Swing it. The balance is perfect. You'll feel its shock-absorbing action as it delivers a power-centered blow.

Polished head is permanently locked to tubular steel handle.

Cushion grip won't slip.

Heft a ROCKET at your hardware store today. True Temper, 1623 Euclid Ave., Cleveland 15, O.



See the JET ROCKET sportsman's axe, too. Super-strong, and the head can't fly off. \$5.25.

**TRUE TEMPER®**  
THE RIGHT TOOL FOR THE RIGHT JOB





James W. Groendyk of Upper Saddle River, N. J., looks over the engine of his prize-winning 1930 Packard Roadster.

**"Quaker State keeps my classic Packard in showroom condition, and my new car, too!"** The big 364 cu. in. straight 8 has only a 5.3/1 compression ratio, takes 12 quarts of Quaker State. Judged top classic in 1958, it was the first to score 100 points, because the judges could find "no imperfection." If you want to keep your car in perfect condition, insist on Quaker State Motor Oil. Refined from 100% pure Pennsylvania crude oil, it gives long-lasting, complete protection. The finest your money can buy!

Available most everywhere . . . always ask for Quaker State by name.

For the name of your nearest dealer, call Western Union by number and ask for Operator 25.



QUAKER STATE OIL REFINING CORP., OIL CITY, PA.  
Member Pennsylvania Grade Crude Oil Association

## Mechanical Crab for Ocean Depths

[Continued from page 87]

The first cable is only a leash. Under the thrust provided by the propellers, Solaris strains against its hold. That's the secret of the depth control. The propellers' pitch can be varied to increase or decrease the thrust. Balancing off that thrust against the pull of the leash controls the height of Solaris above sea bottom.

The forces involved are the same as those in water skiing—with enough tension on the towing line, a skier planes on top of the water. When the tension drops the skier sinks.

The depth control is mostly automatic. The operator at the console on shipboard knows the topography of the ocean floor and at what depth he wants Solaris to operate. He turns a knob to get proper propeller thrust against cable tension.

*Inside Solaris' sphere* is a simple strain gauge to measure the pressure of the water. If the height isn't right, a signal travels back along the electrical cable to a servo motor on a winch that the leash-cable wraps around. The servo motor boosts or decreases tension on the leash-cable, as the situation demands.

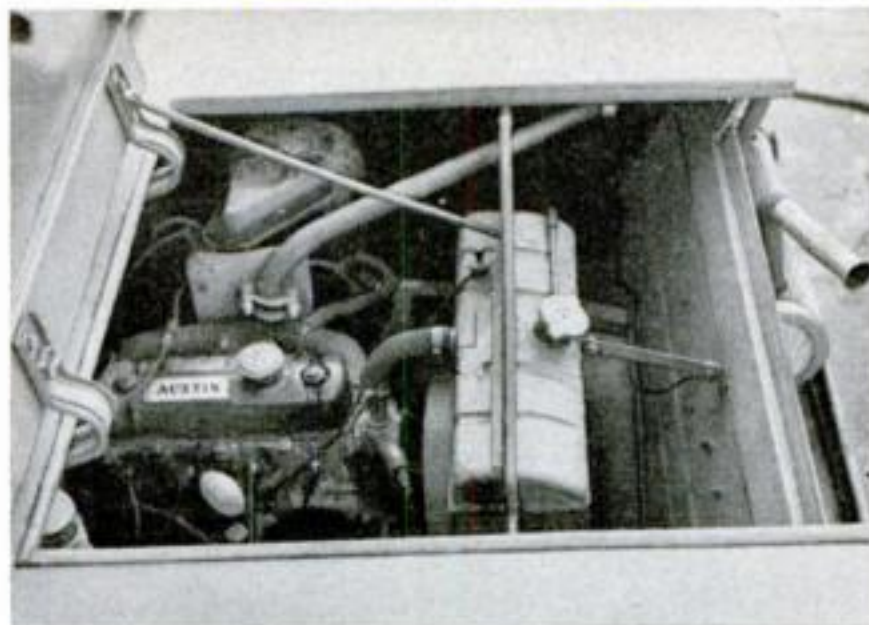
But what if the console operator discovers on his TV screen that Solaris is on the brink of an ocean-floor trench that it must get into to do its job? The operator simply feeds a signal to the strain gauge that, in effect, reduces its sensitivity. The gauge telegraphs the motor winch, the cable tension is reduced, and Solaris drifts down into the trench.

Through the second cable also flow console commands for maneuvering right or left by changing the pitch on one propeller or the other.

It was Vitro's success in designing the second cable that led to the idea for Solaris. The company produced a torpedo for the Navy that trailed a long control cable behind it when it was shot from its tube. Directions fed through the cable to the torpedo's steering mechanism guided it precisely to its target. Solaris was a logical adaptation.

The Vitro people see no end of usefulness to Solaris. As a seeing-eye robot below the waves, it could discover a new shrimp bed, examine a faulty ship's propeller, or—who knows?—even retrieve long-sunken chests of Spanish doubloons.





**AMPHICAR'S ENGINE**—a little, four-cylinder Austin—wails when putting out its 39 horsepower.

I hadn't at all. A little jounce on the steep slope had dug her props into the sand and stopped them. Inadvertently, I had kept power on both the wheels and the props.

Taking the props out of gear, I restarted and revved her up. The open-tread tires dug in and we roared out.

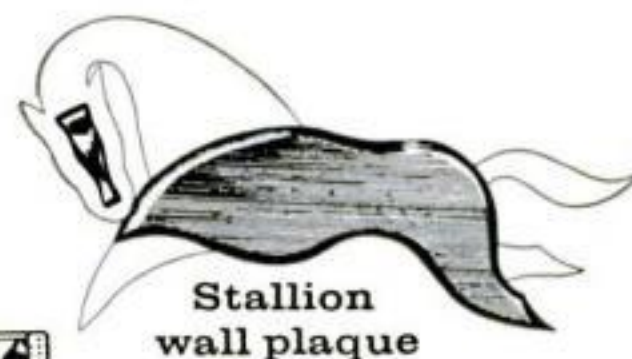
Driving around on nearby paved roads I realized that the Amphicar might indeed be very useful for ranchers, sportsmen, and surveyors. The ride is firm, even reminiscent of a cow pony's: You have a tendency to be coming down while the seat is coming up.

But the little car-boat, for all that it is quirky and austere, can still do things that few other vehicles can.

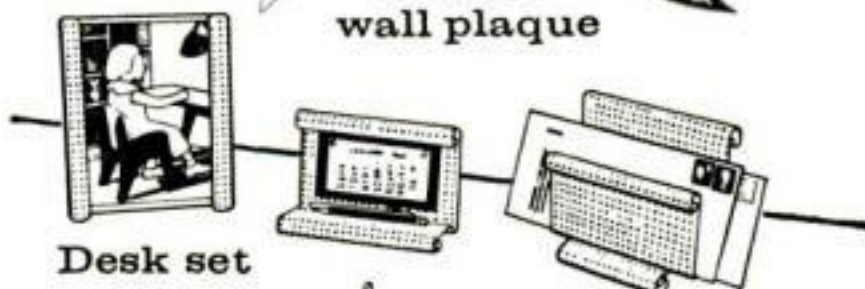
#### FACTS ON THE AMPHICAR

Model: convertible  
 Wheelbase: 80 in.  
 Track width: front, 48 in.; rear, 50 in.  
 Dimensions: length, 13.6 ft.; width, 5 ft.; height, 3.7 ft.; bottom clearance, 8.8 in.; freeboard height, 21.6 in.  
 Weight: 1,738 lb.  
 Engine: 4-cyl. in-line, water-cooled, rear; compression ratio, 8:1.  
 Tires: 5.60x13.  
 Clutch: single-disk dry  
 Gears: 4 forward, reverse  
 Propellers: 2, forward and reverse shift  
 Turning circle (land): 31.11 ft.  
 Gas mileage: land, 29 m.p.g.; water, 1.61 gal. per hr.  
 Tank capacity: 10.6 gal.  
 Top speed: land, about 75 m.p.h.; water, 12 knots  
 Price: about \$2,900

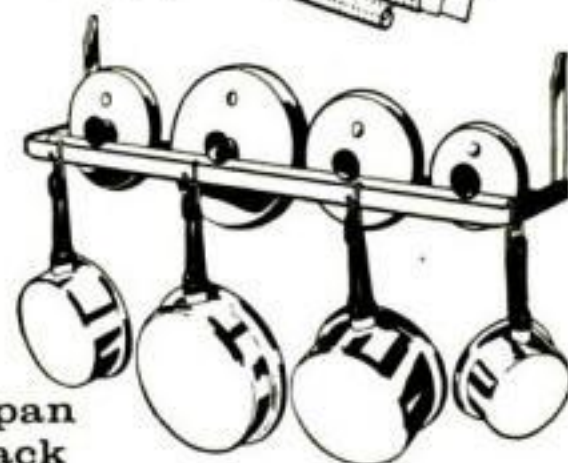
## Make 'em yourself in ONE EVENING



Stallion  
 wall plaque



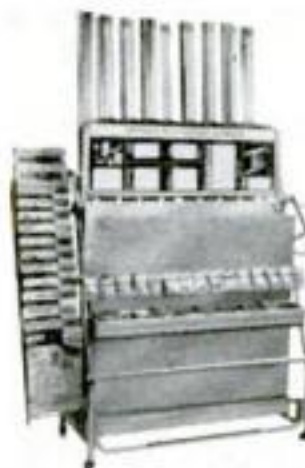
Desk set



Kitchen pan  
 and lid rack

## with Reynolds DO-IT-YOURSELF ALUMINUM

Make any of these handsome, useful aluminum articles in just one evening. Use ordinary woodworking tools. It's fun, it's satisfying . . . and we furnish free step-by-step plans (see coupon).



Look for this rack at most hardware and building supply stores.

sheets, tubing, tubing fittings, window and screen frame sections, fasteners, rod, bar, angle

**Reynolds Metals Co. • Richmond 18, Va.**

Please send Do-It-Yourself Aluminum How-To booklet with free one-night project plans.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Dept. PS



# NOW! a hi-compression staple gun for only \$4.95

With Exclusive  
Push-button Loading  
and Built-In  
Staple Extractor.



Indispensable for home use...and never before priced so low! This compact, all steel, powerful SWINGLINE 101 staple gun is ideal for insulation, carpentry, upholstery, screening, wire fencing, plus thousands of other uses. Handle locks to fit pocket. Lightweight, maneuverable, jam-proof! Staple sizes  $\frac{1}{4}$ ",  $\frac{5}{16}$ ". Send for FREE book—"Tips for Tacking"

## Swingline® INC.

Dept. PS-70 Long Island City 1, New York



### Get New 132 Page Catalog of WOOD AND WOODWORKING MATERIALS

**WORLD'S LARGEST SELECTION—Lowest Prices**  
Your buying guide for finest kiln dried domestic and rare imported woods, inlays, bandings, matched plywood, moldings, ornaments, etc. Biggest selection of tools and hard-to-find hardware. Packed with scroll saw patterns, projects, wood facts and money making ideas. Enclose 25c (refunded on first order) to help pay mailing and handling costs. Write today to **CRAFTSMAN WOOD SERVICE COMPANY** 2729 S. Mary Street, Dept. B-7, Chicago 8, Ill.

## BUY AND HOLD U. S. SAVINGS BONDS

### Does your project require Finely Woven WIRE SCREENING?

Highest quality bronze wire cloth now  
available at a fraction of its original cost

We can furnish top quality remnant trims of extremely fine mesh bronze wire cloth as used in paper making, from  $\frac{1}{2}$ " sq. to any size your projects require. Write, advising size and possible quantity requirements. We will gladly provide free sample.

**WISCONSIN WIRE WORKS**  
APPLETON • WISCONSIN



## The Best Playhouse You Can Build

[Continued from page 130]

in front. The top half swings up by means of a rope-and-pulley attachment fitted to the ceiling and back wall. The bottom half drops out as a ramp.

The door opens out one side of the house and thus turns the playroom into a stage. The play-acting phase in children sets in early and lasts long.

There's a more orthodox entrance via a door with an inside bolt lock. It's four feet high—the proper scale for five-year-olds (average height  $3\frac{1}{2}$  feet) but a bit short for eight-year olds (average height a bit over four feet). Fine, the Gesell Institute said. Eight-year-olds will certainly play in the house, but should know it wasn't designed for such "oldsters."

**The black hole.** But there's a subtler way inside—a tunnel. Concealed in the slide overhang, it's a dark passageway running the six-foot width of the house and entered at either end by crawling through a circle 16 inches in diameter. Halfway along the tunnel there's another hole that leads into the playhouse room.

The fourth wall of the house has a shuttered window just two feet off the floor—the right height for climbing in and out of. A small outside ledge becomes a good hand rail in the process.

When not used for climbing, the window is a good prop. With both shutters open and the ledge now a counter, the window becomes the divider between grocer and shopper.

**The playroom.** Inside the house there's nothing—a deliberate blank. The floor is six feet square (neither too big nor too small from a five-year-old's point of view). The ceiling is six feet high, tapering down where the roof takes a bite.

Here's where the kids take over. Well-meaning parents often discourage children by doing too much for them. Kids don't need window curtains, miniature furniture, dummy kitchen equipment.

A child will drag in whatever he needs to suit the whim of the moment. Sometimes he may just want to feel all closed in—which he can do by bolting the shutters and closing both doors.

Invariably a child will have more fun if you let him choose the way he wants to use the house. It's logical, too. You built the house for him. And a man's home is his castle, isn't it?



## Pop's Strange Old Flying Machine

[Continued from page 171]

Glue and bind one rib above and one below the spar, using a needle to get the threads through the holes and wrapping it crisscross. Then slide in and bind the  $\frac{1}{4}$ " spars of the main plane, and attach the reed outline pieces. Build the elevator the same way, with only one spar.

Cover the frames with lightweight bamboo tissue. Coat the underside of ribs and reed with mucilage, rub the paper into contact, and trim it  $\frac{1}{8}$ " outside. Turn up and paste this over the edges.

Cover the top the same way, with only  $\frac{1}{16}$ " overlap. If small wrinkles appear, steam them out.

After covering, pin both planes down on a flat board to prevent warping. When the mucilage is dry, dope and weight the planes flat again. Don't forget to paper the rear skids and their braces.

Each rubber motor consists of five loops of  $\frac{1}{8}$ " flat rubber, with double-eyed wire hooks at the yoke end. Open the outer eye slightly so that it can be detached and hooked to the winder.

A winder is necessary, for both motors must be wound to equal tension. The drawing shows how to make one.

If your props are mounted to turn inward (toward each other) at the top, and your winder's main gear is outside, hold the plane upside-down when winding it. With a center-gear winder, hold the plane right-side-up. (It's assumed you'll turn the winder forward, or away from you, which is the easier way.)

**Flying the twin pusher.** See that both wing and elevator are square to the fuselage and centered on it. Make a few trial glides without the rubber motors. Set the planes to give a fast but fairly flat gliding angle.

Wind the motors 250 turns (about 50 of the winder handle). Hold the ship with the front end tilted slightly upward, release the props, and launch with a vigorous push to get it up to flying speed.

If the racer turns or tips, slide the wing a trifle to the low side. If it dives, slide the elevator forward, higher on the blocks. Once flights are steady, wind the motors to 800 turns.

Record flights were made by stretching the strands almost double normal length while winding. In this way you can put on over a thousand turns.

# ONLY ONE PLIER GIVES YOU BOTH

1. Reinforcing Rib  
for **ADDED STRENGTH**  
WHERE YOU NEED IT!

2. Machined Undercut  
Channels... **SMOOTH-  
WORKING, CAN'T SLIP**  
UNDER ANY LOAD!



Only CHAN-  
NELLOCK gives  
you these power-  
grip features. That's  
why thousands of skilled  
mechanics—year in, year out—buy  
CHANNELLOCK in preference to any  
other plier. They prefer its terrific grip-  
ping power, its all 'round usefulness.  
And you will, too! Available in three jaw  
capacities:  $\frac{7}{8}$ ",  $1\frac{1}{2}$ " and 2". Ask your tool  
supplier for a genuine CHANNELLOCK  
Plier. If he's out of them, ask him to  
order one for you.

Write for Catalog of Complete Line of Pliers

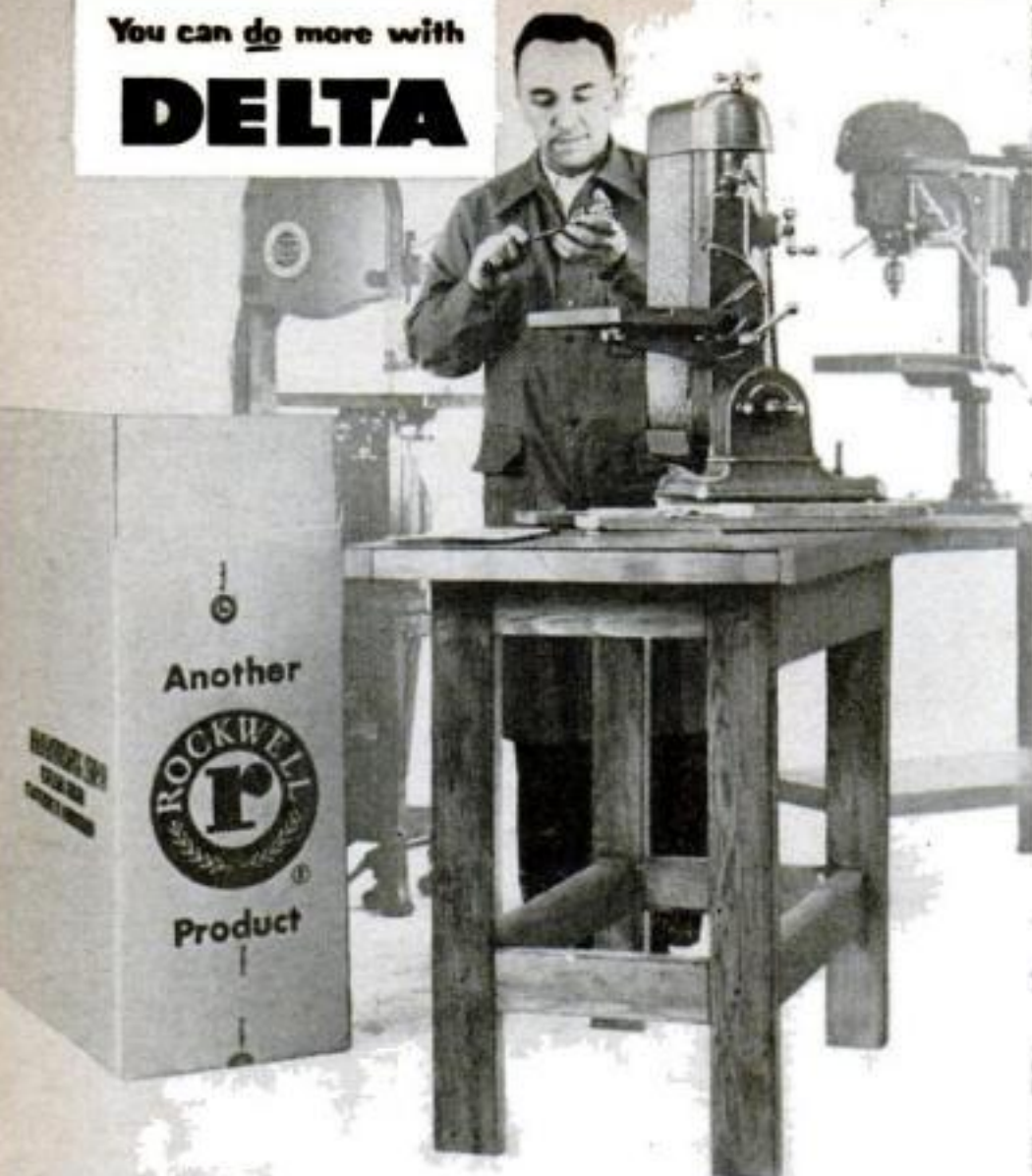
**CHAMPION DEARMENT TOOL COMPANY**

Meadville 2, Pennsylvania



You can do more with

# DELTA



where every tool counts

## you'll want a DELTA

*You just couldn't ask for more UTILITY than this machine delivers!* Finishing, mitering, deburring, chamfering, hundreds of unexpected jobs—in both wood and metal—are all in a day's work for this Delta 6" Belt Abrasive Finishing Machine. You can always keep the work piece level—operate the belt horizontally, vertically, or at any angle in between. Rugged as it is dependable, this machine has many quality extras you'll have to see to really appreciate. Good tools are so *basic* to profitable work—why not start with the best? Call your Delta Distributor (listed under "TOOLS" or "MACHINERY" in the Yellow Pages) for details on this or *any* wood or metalworking tool in Delta's complete line. For FREE catalog, write: Rockwell Manufacturing Company, Delta Power Tool Division, 504-G N. Lexington Ave., Pittsburgh 8, Pa.

DELTA INDUSTRIAL TOOLS

another fine product by

# ROCKWELL



## Portable Phono Plays Upside Down

[Continued from page 146]

screws through rubber isolation grommets. These grommets should not be compressed when the screws are tightened, so use either short lengths of metal tubing for spacers or two nuts on the screw—one on each side of the motor board. Drill oversize mounting holes for the tone arm, allowing adjustment to get just the right overhang (see drawing).

**The case.** Surest way to make the lid and base match exactly is to put the case together as a completely enclosed box—and then saw it apart. Take your exact inside dimensions from measurements of the finished motor board. Be sure to allow for thickness of the material where joints overlap. Use  $\frac{1}{4}$ " hardboard for the sides,  $\frac{1}{8}$ " for top and bottom. All joints are simply glued and clamped until the glue hardens. Sand and paint the case inside and out.

The motor board fits inside the base, resting on  $\frac{3}{4}$ "-by- $\frac{3}{4}$ " aluminum angle attached to three sides. The end is secured to the case with a piano hinge. Angle and hinge are spaced about  $\frac{7}{8}$ " below the top edge of the base. Use another length of piano hinge for the lid. A folding lid support holds the lid open when 10- and 12-inch records are being played. Cover the speaker cutout with screening, grille cloth, or a grille plate, whichever you choose; then mount the speaker with machine screws.

**The finishing touches.** Solder connecting wires to the amplifier to reach the battery, switch, and speaker. Use one center wire and the braided shield in the tone arm to connect the cartridge to the amplifier input. Leave enough slack so you can solder the ends to the proper terminals before the amplifier is mounted.

Solder a small brass hinge to the rest supplied with the tone arm. Mount as shown in a photo to hold the arm in transit. It folds out of the way when you want to play records.

You can get plenty of volume for most purposes with the integral speaker as shown. If you turn up the volume too much you may get a howl caused by mechanical feedback. The amplifier will deliver about twice as much power as the set will tolerate with the speaker in the same box. If you want more volume, house the speaker in a separate box.



**WAR SURPLUS AND OTHER BARGAINS SAVE UP TO 90%**



**PILOT'S MAGNETIC COMPASS** Used by Air Force in Jet fighters. Fully jewelled. Dual compensators. Accurate to 1° for readings at every point. Will operate in all temp. from -55° to +70°C. Graduated in 5° increments. Ideal for panel mounting. Electrically lighted. 2 1/4" W. x 2 3/8" H. Approx. GOVT. COST \$100. Like NEW. \$12.95 (limited quantity).



**CORNELIUS AIR COMPRESSOR** Ideal for filling underwater diving tanks, air horn tanks, etc. Three stage USAF air compressor. Has built-in 1/3 HP. 27 V. DC electric motor. Develops 1500 PSI or may be reset to 2000 PSI. Delivers .04 CFM. Approx. GOVT. COST \$375. Like NEW. \$29.95.



**200 AMP D.C. WELDER** 24-32 volts D.C., 200 amp gen. Extra heavy duty. Internal fan cooling. Brand new 9 H.P., ball bearing, Briggs & Stratton engine. 200 amp generator (direct coupling to engine). Portable wheeled frame mount. Voltage reg. Rheostat. Reactor coil. Welds 1/8" rod to SAE standard, any thickness metal. Complete. Wt. 200 lbs. NEW. A \$750 value. \$199.50.



**AIRBORNE ALL-PURPOSE ELECTRIC WINCH** Fully bearinged 3 HP motor with a reduction of 240 to 1. Will operate on 6, 8, 12, 24 or 32 V. Will lift up to 2 tons. Safety clutch set at 3 tons. Fully reversible. Adjustable hand brake and lock. Drum will handle over 500' of 1/4" steel cable or 3/8" rope. A terrific, compact power takeoff for beaching boats, etc. Will work off any battery within the range from 6 to 32 V. Cost of this unit is less than an installation for a competitive brand. Shpg. Wt. 150 lbs. Complete, ready to run (less cable). Dim.: 8" W x 34" L x 18" H. NEW. \$99.50.

**DC JET GENERATOR ARC WELDING KIT** Complete with GE Type CM-77 Generator (30 volts D.C., 400 Amp., 3000 RPM up; ampere rating is for continuous duty, intermittent amperage is 500 to 600 amps.), also 2 rheostats, 1 voltage regulator, 1 voltmeter, 1 electrode holder, 2 ea. 25 ft. lengths No. 0 welding cable, 1 welder's mask, 1 toggle switch, 10 lb. vacuum packed 1/8 in. welding rods, pair welder's gloves & spline coupling. All units guaranteed pre-tested. Wt. 110 lbs. Approx. GOVT. COST \$700. All items, now only \$64.50.



\*G.E. Generator noted above can be purchased separately. Makes deluxe heavy-duty welder comparable to the finest commercial welders available. Wt. 90 lbs. Approximate GOVT. COST \$600. Gen. alone—\$49.50.



**DOUBLE-V SPLINE 3" PULLEY** For P-1, R-1. GE Gen. shown above. Heavy-duty machine-broached steel. Heavily constructed, will handle any job. Spline receptacle will fit most types of aircraft generators. Set screw locked. Shpg. Wt. 3 lbs. NEW. \$5.95. Triple-V Spline 3" Pulley—NEW—\$6.95.



**140-1 REDUCTION GEAR** For beaching boats, winches, hoists. Ideal motor in golf or boy's electric car. DC motor & clutch. Easily reversible wiring diagram furnished. Hi torque, 105 RPM. Runs on 6-12 or 24-32 V. 65 lbs. gross. Approx. GOVT. COST \$300. \$12.00. Matched splined gear — \$3.00 ea. \*225-1 Reduction Gear — \$13.50.

**NEW 1960 CATALOG!** Tremendous catalog—our biggest ever—fully illustrated—1000s of bargains in war surplus & other items. Send 25c in coin for your copy today or free copy with order. Where ppd. indicated applies to US only. Other prices FOB Culver City, Cal. Send cash, check, money order. 50% dep. COD.



**AIRBORNE SALES CO., INC. DEPT. PS 760**  
8501 Stellar Drive, Culver City, Calif.

**FREE 32-PAGE BOOKLET**

... from your lumber, building material or hardware dealer ... with complete instructions for building, patching or repairing with Sakrete ready-to-use Cement Mixes — your assurance of smooth working, high strength concrete or mortar.

**INSIST ON GENUINE SAKRETE**  
ADVERTISED AND SOLD NATIONALLY



**When Writing to Advertisers Please Mention Popular Science**

**HELP STOP DEATH ON THE HIGHWAY**



**WHERE TRAFFIC LAWS ARE OBEYED DEATHS GO DOWN!**

**SUPPORT YOUR LOCAL SAFETY ORGANIZATION**

Published as a public service in cooperation with The Advertising Council

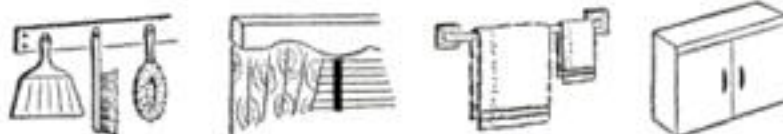
**DEALS! BARGAINS!**

**IT'S TOOLTIME '60** ... time to save money — get bonus deals on top-quality Millers Falls hand and power tools. Big selection. See your dealer today.

Write for Free Folder  
**MILLERS FALLS COMPANY**  
Dept. PS-35, Greenfield, Mass.



**HANG FIXTURES SECURELY...**



**USE MOLLY**  
**SCREW ANCHORS and JACK NUTS**



**JACK NUTS GRIP ANY MATERIAL, WORK IN NARROW SPACE**

Jack Nuts need only 3/8" expansion space ... now you can fasten fixtures to flush doors! Grip any material up to 3/4" ... perfect for use in thin materials where wood or sheet metal screws won't hold!

**BETTER THAN NAILS & SCREWS**—Molly lets you put fixtures where you want ... not just where studs are. Spider backing reinforces area in which used, won't pull through. **BETTER THAN TOGGLE BOLTS**—Easy to install, needs much smaller hole, fixtures can be removed and replaced in same anchor! Inexpensive, guaranteed. Ask your hardware dealer for genuine Molly ... the name is stamped on the cap.

SEND \$1.00 FOR SAMPLE BOX OF 12



EXPANDS BEHIND WALL

**MOLLY** Corp.

204 N. 5th St., Reading, Pa.

Enclosed is \$1.00 for sample box of (check one) ☐ Mollys ☐ Jack Nuts

NAME

ADDRESS

CITY

ZONE

STATE



Day after day  
a highly  
serviceable  
hammer

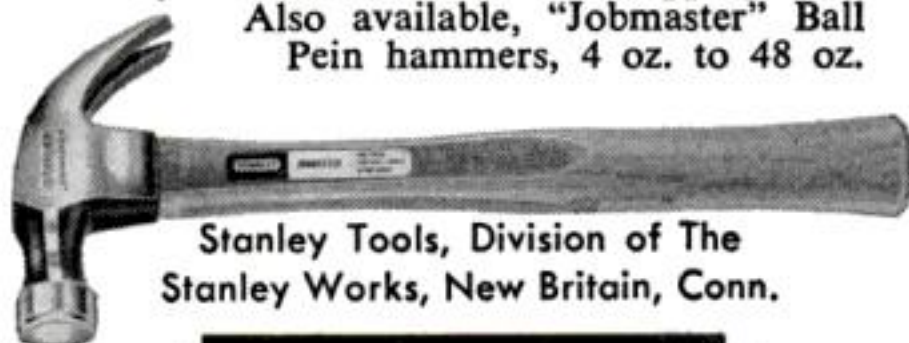
# STANLEY

## "JOBMASTER"...\$3<sup>50</sup>



Here's a budget-priced, 16 oz. hammer designed for hard use and your comfort. Its super-heat-treated head has just the right hardness and temper. And its triple-wedged, straight-grained hickory handle is perfectly shaped. It's good-looking, too! You have your choice of a curved or ripping claw.

Also available, "Jobmaster" Ball Pein hammers, 4 oz. to 48 oz.



Stanley Tools, Division of The Stanley Works, New Britain, Conn.

# STANLEY®



FREE  
BOOK  
TELLS  
HOW

## CLOGGED SEWERS?

CLEANED INSTANTLY BY IMPACT  
SAVES PLUMBING BILLS—TIME

Anyone can trigger new Flush Gun shooting air & water impact on stubborn stoppages in Toilets, Sinks, Urinals, Bathtubs, & Sewers 200 ft. in pipe 1 1/2" to 6"; Rafts, Grease, and Roots melt away INSTANTLY when struck by hammer-blow. Amazingly effective. Worth many times its cost in Plumbing Bills or start your own Business. Tear out Ad now & write address beside it for FREE BOOKLET or phone Kildare 5-1702. Miller Sewer Rod, Dept. PS-7, 4642 N. Central Ave., Chicago 30, Illinois.

## DO MORE PLANING JOBS WITH LOW COST BELSAW



Exclusive MONEY-MAKING Features: Full 12 1/4" x 6" capacity • Power feeds at 14" to 34" a minute • Provides for Grinding Knives in the Cutter-head • Attachments for Jointing, Rabbeting, Tongue, Matching, Groove. Convert low cost rough lumber into high priced stock. Easy to make flooring and popular patterns. Send Today for FREE Literature and Prices.

Belsaw Machinery Co., 2061 Field Bldg., K.C. 11, Mo.

LOW DOWN  
PAYMENT  
EASY TERMS

## TOOLS WHOLESALE

**\$100 PUTS YOU IN BUSINESS**

Start your own business, sell tools to your friends and neighbors, or buy tools for your own use and **SAVE MONEY \$\$\$**

A MILLION DOLLAR INVENTORY AT YOUR FINGERTIPS. NO STOCK TO CARRY. ORDER AS YOU NEED IT.

**BUY AT WHOLESALE PRICES.** Extra \$25.00 profit on your accumulated purchases. \$1.00 refund on first purchase or refunded if you are not 100% satisfied.

**THOUSANDS!!** of Nationally Advertised items of Hand Tools, Power Tools, Machinist Tools, Tool Chests, Paint Sprayers, Light Fixtures, Appliances, Guns, Gifts, Toys and other items too numerous to mention.

**WE SHIP COAST TO COAST**  
Wholesale Discounts up to 50% OFF

**SILVO HARDWARE CO., Dept. PS-7 107 Walnut St., Phila. 6, Pa.**

## How Parking-Lot Gyps Operate

[Continued from page 90]

him out, and tell him to leave the engine running. It never fails. He's flattered by the royal treatment."

If you must leave your key in the ignition, don't leave any of your other keys with it. Sometimes burglars work closely with parking attendants. Not only does the attendant let the burglar "borrow" cars, but he helps build up a prospective list of lootings as well.

Suppose all your keys, including those to your home and office, are in the case with the ignition key. Suppose, too—as is often the practice—that the case carries your identification or registration card. All that the attendant, in cahoots with a burglar, has to do is duplicate your keys, including your ignition key.

If the burglar tails you, picks up your car where you park it, drives it into your own driveway and loots your belongings at his leisure, what neighbor is going to get suspicious?

## "Renting" cars to criminals

Sometimes attendants rent out parked cars to criminals. The attendants know the habits of their regular customers. They know at what hour a car will be claimed. The "rented" car brings the attendant up to \$25 an hour. If the criminal driving it encounters trouble, he can abandon it. To the police, it's only one of thousands of cars stolen from parking lots all over the country.

You have one way of being reasonably safe from this. If the lot insists that you leave the ignition key, make a note of your mileage reading. Even so, a cunning attendant can rent out your car and disconnect the odometer.

The service-while-you-park lots have other ways of making a fast buck. You will be charged for an oil change, when all that has been done is to add a quart to bring up the dipstick reading. And how often do you check your chassis when you've asked for a grease job. Charging for it, and not doing it, is pure gravy. If you have ordered 10 gallons of gas, how can you argue that you got only eight? You weren't around.

Be wary. Be suspicious. If you do get hooked by a dishonest attendant, report it promptly to the police. It's the only way such thievery can be stamped out.





**FLYING MACHINE.** Called a reaction-control simulator, this strange device in Boeing's Seattle lab is subjected to conditions like those in airless outer space. Instead of rudders, elevators, and ailerons, flight controls such as blasts of gas, flywheels, and gyroscopes are tested.



**MERRYMOBILE.** This attention-grabbing three-wheeler is made by the Merrymobile Co. of Memphis for ice-cream vendors. Production schedule for the year is about 100 Merrymobiles. It's powered by an International engine developing 18 hp. The engine also powers a one-hp. compressor for refrigeration.



### The man who didn't WYNN!

Spots on his garage floor meant his car's automatic transmission was leaking but he didn't pay any attention to it — *now he's paying for it!* Check your garage floor for this danger signal and avoid costly repairs with the guaranteed Wynn's Automatic Transmission treatment. It takes only minutes at your service station, garage or new car dealer. Stops the leak within 100 miles or it costs you nothing.



Available throughout  
the United States  
and every country  
of the free world.



Wynn's Friction Proofing products also available for Farm and Industry. For further information write Dept. F. Wynn Oil Company, Azusa, California • Affiliated companies in: Toronto, Canada; St. Nicolas Waes, Belgium; Caracas, Venezuela





**Speedy Sprayer**  
**sprays paint**

**7 times faster than hand brushing!**

And what a finish . . . smooth, flawless, no brush strokes. So easy—just pull the trigger. Speedy Sprayer is a real professional tool. Paints anything, toy to a house. A must for every workshop. Operates with any ¼ or ½ hp motor. 890 OUTFIT, less motor, **\$42.50**  
Mobile Wheel Kit, \$7.50 extra  
Prices slightly higher in the West

**W. R. BROWN CORP.**  
Specialists in Portable Sprayers for 38 Years  
2637 N. Normandy Ave. • Chicago 35, Ill.

*Wheel it to the job!*

**FREE! "How to Spray" booklet and catalog. Write!**

**WELD BRAZE**  
**SOLDER CUT**

**4WAY**  
**ONLY \$14.75**  
f.o.b. factory

**WELDER**

Acclaimed by thousands of Homeowners, Mechanics and Hobbyists as the welder of 1001 uses. Easily operated from properly wired 110 volt AC or DC line. The ideal gift with a life-long use. Order today on 10 day money back guarantee. Send only \$3.00 today. Pay Postman balance C.O.D. plus charges. Literature on larger equipment on request.

**FOUR-WAY WELDER CO., Dept. F3-G**  
1810 S. Federal St. • Chicago 16, Ill.

Complete with Twin Carbon Arc Torch and accessories . . . to handle all metal-craft work.

**FREE CATALOG!**

**TREMENDOUS SAVINGS ON HUNDREDS OF SURPLUS AND NEWLY MANUFACTURED ITEMS!**

New 1960 edition contains over 50 pages of tools and equipment for farm, home, workshop, factory. Hydraulic equipment, pumps, motors, construction and diesel equipment and parts!

**Write for your FREE CATALOG Today**

**GROBAN SUPPLY COMPANY**  
1139 South Wabash Ave., Dept. F-7 Chicago 5, Ill., WEbster 9-3793

**GUNK® degreases**

At better automotive supply and hardware retailers everywhere.

Cleans engines, garage floors, power mowers, greasy walls economically and safely. In aerosol or pour spout cans.

**GUNK CHICAGO CO., River Forest, Illinois**  
serving the Midwest and Southwest  
**RADIATOR SPECIALTY CO., Charlotte, No. Carolina**  
serving the East, Southeast and far West

## How I Built the Flying Cart

[Continued from page 164]

68 pounds to balance with the motor not running—only four pounds when it was turned on.

Scarcely a resounding success. But in spite of air leaks, turbulence, fan inefficiency, and high weight-to-power ratio—I was getting 64 pounds of lift. It wasn't hard to think up reasons for going ahead.

**The one that worked.** Poring over all the research papers I could find, I came up with these rough specs:

- **Shape—square.** For a given area, power, and operating height, the shape with the shortest perimeter gives the most lift. A square is the closest practical approach to the optimum circular shape.

- **Size—5' by 5'.** The most significant factor in GEM performance is the "height-diameter" ratio (h/d). Within limits you can trade one for the other and carry the same load. A larger vehicle would operate higher off the ground, but it becomes clumsy to use and a problem to store.

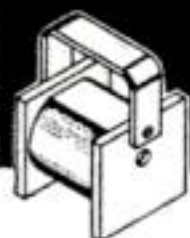
- **Design—plenum chamber.** This is like an inverted saucer with the air cushion retained inside the bowl. It's the simplest of the proven GEM configurations, and gives good hovering efficiency close to the ground.

- **Power—chain-saw engine.** The tentative design promised to lift about 30 to 35 pounds per horsepower, as nearly as I could estimate. A reasonable payload would require five hp. The lightest five hp. I could think of was a chain-saw engine.

- **Propeller—???** This turned out to be a shopping problem. I was getting discouraged about finding one that would fit the shaft, blow the right way for engine rotation, and provide optimum load for the engine. But a half-dozen problems were solved at once when the Airboats unit was suggested to me. It uses a five-hp. Power Products chain-saw engine with reversed rotation and has a properly matched prop.

**Building the airframe.** Problem: How do you make a close-fitting duct for the fan and a smoothly contoured bowl for the plenum chamber with ordinary woodworking tools? Fiber-glass laminate would give the needed shapes, but would be complex to mold, and also would be too heavy in the required strength. A skilled tinsmith could do it with sheet alumi-





# MAGNETS

TSX-15

TSX-15 Magnet Assembly (150 lb. pull) Each...\$ 9.50  
TSX-14 Magnet Assembly (100 lb. pull) ..... 7.25  
TS-2 Alnico 5 Pot Holder Magnets 50 magnets 3.50  
TS-5A Rectangular U's (4 lb. pull) 10 magnets 3.25  
TS-6 Sample Magnets & Catalog (over 200 sizes listed)..... 25c

Send check or money order, sorry, no C.O.D.'s

We specialize in Magnets—10 Day Trial—Money Back Guarantee

TERRY SALES CORPORATION, P.O. Box 98, Lake Park, Fla.

## Famous 400-IN-ONE-SAW HOLDER Eliminates special tooling

For any home workshop to huge plant. Holds over 200 Saws & Cutters. Saves tooling costs, set-up time. Use with drill press, lathe, milling or automatic machine, any power spindle machine. Many other uses. Perfect Gift. Case hardened & ground, with rust-proof black oxide. UNCOND. GUAR.  
Model 101 (1/2" shank—Insert type) . . . \$13.50;  
Model 100 (1/4" shank—Insert type) . . . \$9.95;  
Model 103 (1/2" shank—Pyramid type) . . . \$13.50;  
Model 104 (1/4" shank—Pyramid type) . . . \$9.95;  
All 4 models only \$39.95. Send check or M.O. to Tom-Tec Products, P.O. Box 298-A, Prattville, Ala.



## HELP THE U.S. WIN THE 1960 OLYMPIC GAMES



### ...and get this souvenir postcard from Rome, Italy

The U.S. Olympic Team needs funds to help send a *complete, fully-trained* group to the 1960 Olympic Games. Just a one dollar contribution from you can help them do it. And to acknowledge your contribution, you'll receive a special souvenir postcard, postmarked from Rome, Italy, and autographed by leading members of the U.S. team.

#### MAIL THIS COUPON TODAY

OLYMPIC National Headquarters, Olympic House  
57 Park Ave., New York 16, New York

Here is my \$1.00-donation. Please send me the special Olympic souvenir postcard.

Name.....

Address.....

City.....Zone....State.....

**LARGER DONATIONS GRATEFULLY ACCEPTED**  
Donations can be deducted on income tax returns

Preparation Costs of This Announcement Donated by  
These Chicago Companies:

Hayes-Lochner, Inc., Typography  
Schreiner-Bennett, Inc., Art Work  
Rapid Copy Service, Inc., Photostats  
Rogers Engraving Co., Engravings  
National Electrotpe Co., Plates & Matrices

This Space Donated by **POPULAR SCIENCE**

**palley's**

**NOW PRESENTS**

**PIRELLI**

UNDERWATER EQUIPMENT PIONEER

### NEW "ALFEO" MASK

Depth record holding Mask. Has full "Stereo" Vision to provide widest undistorted view. Has stainless steel band and tempered glass safety lens. Body of special blue Italian rubber.

No. P-121 ..... \$3.95

### "EXPLORER" REGULATOR WORLD'S DEPTH RECORD HOLDER—429 ft. DOWN

Safest Air Regulator—allows 80% more diving time from standard tanks—Easier breathing. Eliminates diaphragm pressure differential...bellows principle flows the air into diver's lungs. This is the Premiere U.S. offering. Be the First with the Finest!

Cat. No. P-101..... \$79.95

### NEW "ARIES" PNEUMATIC GUN

Manually pumped, no cartridge necessary.. Up to 20 shots per charge. The ultimate in underwater power. All integral parts are precision stainless steel. "Contest" approved

No. P-111 ..... \$49.95

### Pirelli "PROCIDA" SUB-ARTIC SUITS

Finest quality "Dry-Type" suit. Designed to maintain body temperature in coldest water. Seams strip reinforced and vulcanized. Has exclusive seat, elbow and crotch pads. Built-in boots. Sizes: Small, Med., Large, X Large.

No. P-171 — "PROCIDA" ..... \$64.50

Pirelli "ALCIONE" FIN — Here is the ultimate in speed and lightweight comfort. Full-foot, form-fitting with fin tip rigidity and power angle design. Molded in finest special compound Italian floating rubber.

No. P-141, Size 5-7 6.95

No. P-142, Size 8-9 7.95

No. P-143, Size 9-11 8.95

NOTE: The equipment above is only a partial listing of the Pirelli line. Send for NEW 1960 CATALOG of DIVING EQUIPMENT.



### JUNIOR SWIMMING and DIVING TRAINING UNIT...

A "snorkle" type swim-aid—portable and compact. Perfect to instill confidence in the child learning to swim. Child can swim along surface or release float pantoon and enjoy submarine swimming to depths of 2-1/2 to 4-1/2 feet. Complete with face mask, hoses, snorkle air valve, floating "tanks", carrying bag and instructions.

\$11.95



### FILL AIR TANKS TO 2250 PSI CORNELIUS COMPRESSOR AND MOTOR

Has a Surplus Cornelius Compressor combined with a NEW 1/2 HP, 115/230 V., 60 cycle AC motor; a mounting frame and built-in carrying handle. Pressure tested up to 3000 PSI. Fills diving tanks or use wherever high pressure air is needed. **9950**

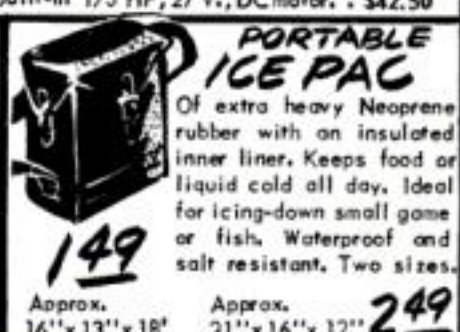
Surplus Cornelius COMPRESSOR—Unconverted. Rated to 2500 PSI. Built-in 1/3 HP, 27 V., DC motor. \$42.50



### 2-MAN TENT

1188

Body of tent is waterproof Vinyl and has sewn-in waterproof floor. Entrance has storm flap and mosquito net closure. Comes with two poles, 6 ft. ropes and tent pegs. Size: 6 ft. x 4 ft. x 3-1/2 ft. high. Complete in zippered carrying case.



### PORTABLE ICE PAC

Of extra heavy Neoprene rubber with an insulated inner liner. Keeps food or liquid cold all day. Ideal for icing-down small game or fish. Waterproof and salt resistant. Two sizes.

149

Approx. 16"x13"x18"

Approx. 21"x16"x12" 249



### STAINLESS STEEL MESS TRAY

One-piece stainless steel. Has six compartments and rolled edges. Easy to stack and clean. Ideal for camp, cabin, clubs, commissary, church, etc.

No. C-MT1 NEW 159 EA.  
\$6.00 value.



### 16MM GUN CAMERA

The "Gun" Camera used by the Navy & Air Force. Takes a standard 16mm magazine. Battery operated. Ideal for B&W and color film. Gov't cost approx \$200

NOW 229

**palley's**

2263 E. VERNON AVE., DEPT. PS-70  
LOS ANGELES 58, CALIFORNIA

TO ORDER: Send Check or Money Order. 1/2 deposit with C.O.D.'s. All items sent freight or postage collect.



**Figure the costs...it pays to**

# GO CUSHMAN.

A sleekly styled, precision engineered Cushman scooter saves you money all-around—on initial investment, operating costs, upkeep and maintenance, taxes and insurance. You find enjoyment in the safe, sure way it handles . . . in a sensation of dynamic ruggedness. And it goes everywhere, parks anywhere.

Ask your dealer for demonstration or write for information



The smart 1960 Road King

**CUSHMAN MOTORS**

1038 No. 21st, Lincoln, Nebraska

A subsidiary of Outboard Marine Corporation, maker of Johnson and Evinrude outboard motors

**NEW! Low Cost SCOOTER INSURANCE**

## Constantine's Catalog & Manual for WOODWORKERS

ALL-NEW! 1960 Edition. More than a catalog—a manual, too! 130 pages—exciting new items! Since 1812, world's most complete source for rare imported & domestic woods at rock-bottom prices. Inlays, bandings, carvings, hard-to-find hardware, inlaid wood picture kits, new brass hardware, etc. Plus tools, plans, projects. Enclose 25¢ (refunded on 1st order). Get FREE "Chips & Chats" too. Write NOW!

**ALBERT CONSTANTINE AND SON, INC.**

2050 Eastchester Rd., Dept. K-6, New York 61, N. Y.



## DRAINS cellars, cisterns, wash tubs; IRRIGATES - CIRCULATES - SPRAYS



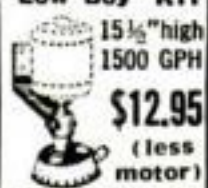
**1,001 uses.** Stainless shaft. Won't rust or clog! Uses 1/8 HP motor or larger . . . **\$7.95** for up to 2,400 GPH; 450 GPH 80' high; or 1800 GPH from 25' well. 1" inlet; 3/4" outlet. Coupling included free. **Heavy Duty Ball-Bearing Pump.** Up to 5,200 GPH. **\$12.95** 1 1/4" inlet; 1" outlet.

Postpaid if cash with order. Also other sizes, types.

**MONEY BACK GUARANTEE.**

**LABAWCO PUMPS, Belle Mead 3, N. J.**

## CELLAR DRAINER 'Low Boy' KIT



15 1/2" high  
1500 GPH  
**\$12.95**

(less motor)

'High Boy'—32" high, 3,000 GPH (less motor)  
**\$15.95**

**It's Sharp . . . keep it that way with the right sharpening stone by**



**CARBORUNDUM®**

## How I Built the Flying Cart

num, using aircraft-type construction, but that was beyond me.

Plywood frames sawed to shape and covered with a skin of aluminum and plastic were the answer. The final design proved to be easy to build and turned out surprisingly strong and rigid for its weight. The completed machine, including the engine, weighs only 80 pounds.

**Building the Flying Cart.** First I cut out the two 32" squares of 1/2" plywood and the eight 3/8" plywood struts. I made a trial assembly of these parts, which form the backbone of the vehicle, using 5" bolts and TeeNuts to clamp it together. All other dimensions were taken directly from this framework. After all the wood framing members of the "hull" were nicely fitted, they were taken apart and reassembled, with waterproof glue and wood screws for all joints.

The sheet aluminum was fastened on next. The inner edge was screwed to the 1/2" plywood first. The sheet was then pushed in tight against the inner curve of the struts and the bottom edge screwed to the one-by-two bottom frame. The 1/2" overhang at each end of the aluminum sheet was snipped every 1 1/2", the lip hammered flat against the strut and stapled with a stapling gun. The fan shroud went on next, with the top and bottom edges fastened in a similar fashion.

Enclosure of the plenum chamber was completed by clamping six-mil polyethylene across the corners, using the two 1/8"-by-1" aluminum strips and the sawed-to-shape 1/4"-plywood bottom piece.

The deck was assembled dry, placed in position and the notches for the struts marked. After the notches were cut, it was reassembled, with glue and screws.

**First tryout.** I didn't wait for such niceties as handles, throttle control, blade guard, and proper motor support, to see if it would work. With the major structure finished, I bolted a pair of angles directly to the frame to support the motor.

The engine took hold on the third pull of the starter rope. With a roar from the unmuffled exhaust and a cloud of dust from my driveway as it was swept clean by the air blast, the Flying Cart was first airborne at dusk one Sunday afternoon. It rose about three inches from the ground and hovered there. Startled faces popped up in neighboring windows



### How I Built the Flying Cart

and a horde of small fry materialized from nowhere. Cries of "What is it?" were soon replaced by, "Can I ride?"

I soon paid for my impatience. The motor support proved to be too limber and vibration broke the straps holding the gas tank.

Back in the shop, the motor support was stiffened by clamping the ends of the angles tightly between hardwood blocks and adding a second pair perpendicular to the first. Handles and flexible-cable throttle control came next.

**Remembering the demand for rides,** I made a removable platform to cover the engine. Supporting legs went through 1" holes in the deck and top main frame and were anchored with slip-in floor flanges screwed to the bottom main frame.

Early trials of the finished vehicle quickly led to the first two modifications. It would carry a load nicely on smooth pavement, but got into trouble on rough ground or going over a curb. A flexible skirt at the bottom caused the rigid part of the craft to ride high enough to clear obstacles. The skirt easily conforms to uneven surfaces and retains the air seal. This also eliminated most of the pushing in climbing hills. By holding the machine level on a slope, all the air escapes on the downhill side, thus providing thrust to push the cart uphill.

If you let go of the handles, reaction to the prop torque made the whole cart spin around. Vanes set in the air stream counteracted this, after a bit of fussing to get the correct pitch. An unexpected bonus resulted: The vanes seemed to smooth the air flow in the plenum chamber and gave a measurable improvement in lift.

The plastic corners are a considerable aid to the experimenter. With cloth ribbons stuck to various surfaces inside the chamber, a light shining through one corner will let you observe air-flow patterns through the other three. Some curious things have shown up. Under certain operating conditions, part of the air flow seems to want to give a negative lift. It may actually be creating a suction that is limiting the operating height of the vehicle. Next step: modification of the air flow to eliminate this apparent negative lift. The machine may yet prove to be large enough to ride successfully.

**Bore 35 standard holes with just one tool**

### New IRWIN Expansive Bit

lets you dial your size

Just turn the dial and you're set to go with this new Irwin Expansive bit. No hunting for the size you need. Fits all hand bit braces. Clean, fast, accurate boring action from  $\frac{7}{8}$ " to 3"—35 standard hole sizes in all!

And what a really fine precision tool to own. It's drop-forged from special bit steel, heat treated full length, machined for accuracy and sharpness, highly polished, too. Two cutters supplied with each bit. Model No. 21 with  $\frac{5}{8}$ " to  $1\frac{3}{4}$ " boring range also available. Ideal for home handyman, professional woodworker, or farm. See your independent hardware dealer soon.

**No. 22 Micro Dial only \$4.00**  
 $\frac{7}{8}$ " to 3" boring range

**IRWIN**

Wilmington, Ohio

the original solid center auger bit

screw drivers  
screw driver bits

KEEP YOUR...



**BENJAMIN**

Largest Selection in the World—  
Single Shot & Repeaters  
for Every Shooter's Needs! • 25 MODELS

**HI-COMP AIR GUNS AND POWERFUL CO<sub>2</sub> GUNS**

No. 3600 \$19.95

You Can **DEPEND** on BENJAMIN . . . for Safety—Power—Accuracy—Convenience—Economy



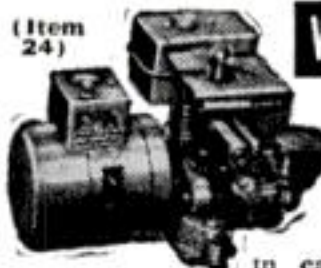
No. 2600

No. 2600 BENJAMIN Super 35-Shot BB Gas Pistol. Safe—No Pumping—Uniform Hi-Power. For Target & Small Game. \$18.95  
No. 2620 BENJAMIN 20-Shot Cal. 22 Gas Pistol. Economical. \$20.95  
No. 1300 50-Shot BB Air Pistol \$23.50  
No. 1320 BENJAMIN 35-Shot Cal. 22 Air Pistol \$25.50

No. 3600 BENJAMIN Super 100 Shot BB Gas Rifle. Non-Toxic—Safe—Convenient—Uniform Hi-Velocity Power. \$19.95  
No. 3620 BENJAMIN Super 85 Shot Cal. 22 Gas Rifle . . . \$21.95  
No. 3100 Super 100 Shot BB Air Rifle. Adj. Shooting Force \$24.95  
No. 3120 BENJAMIN Super 85 Shot Cal. 22 Air Rifle . . . \$26.95

**FREE** Catalog All Models Benjamin Single Shot & Repeaters—Cal. BB or 177 or 22. Also, Special Hunting & Fishing Knife Offer.

**BENJAMIN AIR RIFLE CO., 852 MARION ST., ST. LOUIS 4, MO.**



(Item 24)

### World's THRIFTIEST Light Plants

700 Watt, push button start, 115 v. 60 cyc. AC. 2.2 HP. easy starting Briggs eng. No wiring necessary: just plug in and operate. Plenty of current for any oil burner, freezer, brooder, emergency lights, etc. which require up to 700 watts. Ideal for television and radios. Complete with voltmeter and built-in winding to charge 6 v. auto batteries. (Item 24) Wt. 75 lbs. Easily fits in car trunk. Be prepared if storm knocks out power lines. Reg. \$275. . . **\$143.50**

1200 Watt Plant (Item 45) same as Item 24 but larger generator and engine with 50% greater output. . . **\$199.50**

**MASTER MECHANIC MFG. CO., Dept. B-76 Burlington, Wis.**

Southern Customers Order from Dept. B-66, Box 65, Sarasota, Florida



# GIGANTIC SURPLUS SALE!

## FISH & WORM SHOCKER

● **ITEM #670.** Harvest worms, clear private ponds of coarse fish. Powerful 110-v AC hand geared generator creates powerful electric field in ground or water. Amazing results. ● Also fascinating for experimental use for fun at parties. Has Super-Alnico magnets. Govt. cost over \$12. **SALE ... \$3.89 Ppd.**

Write for **FREE BIG 1960 CATALOG**

Save to 70% on 1000's of Surplus and New Equip. Bargains

**MONEY BACK GUARANTEE ON ALL ITEMS**

## SPECIAL OF THE MONTH

**Antique Magneto Telephone**  
● **Item #704.** Attractive oak case phone in workable condition. Refinishes beautifully. Unique novelty—all the rage in California. Use as extension phone, built-in kitchen radio, planter, home intercom, etc. Charming in den, library, kitchen, etc. Wt. 18 lbs. Orig. cost \$25. **SALE, \$5.95 FOB (2 for \$11.)**



## FARMER-CONTRACTOR PUMP

● **ITEM #200.** 2 1/2" size, 16,500 gph. Brand new bronze ball-bearing centrifugal pump. Fine for irrigation-contractor pump. Industrial uses. 280 gpm. 65 ft. head. Complete with 6" pulley, 2 1/4" intake, 2" discharge. Wt. 37 lbs. Govt. cost \$98. **SALE, \$49.50 FOB**



## STANDARD DIAL PHONE



● **ITEM #715.** Modern hi-efficiency attractive dial phone. Use for extension to main line on private system. Use several for complete private system, etc. Complete. Work on any system. Govt. cost \$25. **SALE, \$8.95 Ppd.**

**SALE, \$8.95 Ppd.**

**SURPLUS CENTER**  
LINCOLN, NEBR. DEPT. 829

## Answers to

## PS Puzzlers

on 18 and 20

**The riddle of the Sphinx.** Oedipus rightly guessed that the creature was man in his three ages: as a baby crawling on all fours, as an adult standing on two feet, as an old man leaning on a cane.

**The three gods.** The gods' statements reduce to:

A: "B is the God of Truth."

B: "I am the God of Diplomacy."

C: "B is the God of Falsehood."

A's statement makes it impossible for A to be the God of Truth. So does B's statement about himself. Therefore C must be the God of Truth. That means his statement is true. So B is the God of Falsehood. And that makes A the God of Diplomacy.

**Relatives.** 1) It's a grandfather, a father, and a son who sit down to breakfast. The father then satisfies two conditions. He is both a father and a son.

2) "Don't be silly, ma," said the little Indian.

3) One—through a lot of cousin marriages. This is how it's possible: The host's mother has two brothers: Brother I and Brother II.

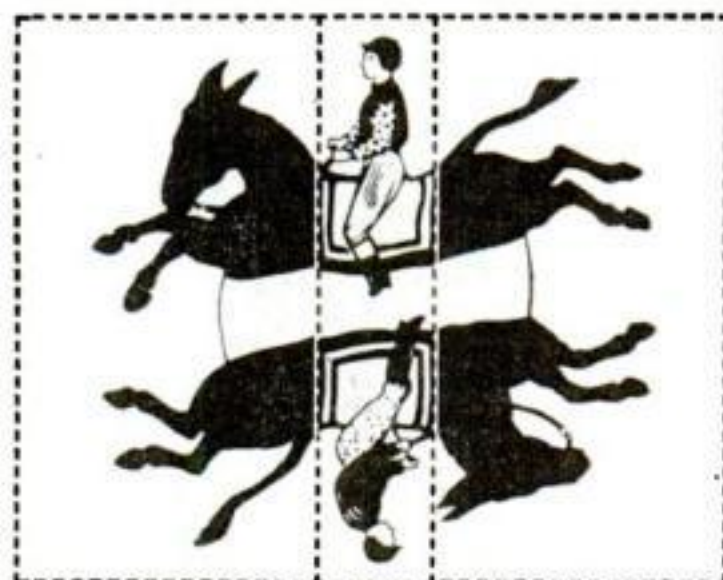
The host has a brother who married a cousin, a daughter of Brother I.

The host has a sister who also married a cousin, the son of Brother I.

The host himself married another cousin, a daughter of Brother II.

In this way, Brother I (the host's uncle) is the host's father's brother-in-law, his brother's father-in-law, his brother-in-law's father, his father-in-law's brother. You can draw a genealogy chart to check if you like.

**Donkeys and riders.** Turn the donkeys around so that they're leaping:



**The magnet.** Hold the end of either bar against the center of the other. As the poles of a bar magnet are at its ends, there will be strong attraction if the end so presented is that of the magnet. If there is little or no attraction, then the bar presented is steel and the other bar must, by elimination, be the magnet.



## FREE BOOK CLOGGED SEWERS REMEMBER THE COSTLY PLUMBING BILL

Chicago—July 1. Just introduced is a Free Booklet on machines which enable the Home Owner, Janitor or Factory Maintenance Man to Rod-it-himself—

Yet anyone can operate this new Rodding Tool which is whirled down the drain in a few seconds. SINKS, BATHTUBS, TOILETS, URINALS, FLOOR DRAINS, HOUSE TO STREET SEWERS can be cleared of Rags, Grease, Paper, Sand while Cutter blades can be added for removing roots. A new discovery in Swedish Music Wire gives the rod 100% more Flexibility.

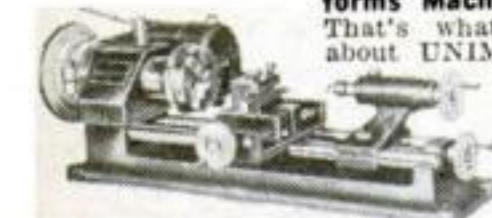
Another new unit is the Miller Electric Rodder which has patented cutters that expand automatically to the size of the pipe. It will clean out heavy obstructions in pipe diameters 3" to 12". Smaller Sizes available. But now, what are these Tools worth in **COSTLY PLUMBING BILLS SAVED.** Tear this Ad out—and write your name and address beside it for **FREE BOOKLET** on Hand and Electric Units. Obey that urge. No Agent will call. A postcard will do (Chicago Phone Kildare 5-1702)

Miller Sewer Rod, Dept. PR-7, 4640 N. Central Ave., Chicago 30, Ill

## "MINIATURE MACHINE SHOP

No Bigger Than A Typewriter, Outperforms Machines Many Times its Size!"

That's what Mechanix Illustrated says about UNIMAT in their 3 page feature story in the May issue. If you want a reprint of this story plus complete information about this amazing 10 in 1 combination precision tool write to:



AMERICAN EDELSTAAL, INC., UNIMAT DIV., Dept. HG, 350 B'way, N.Y. 13

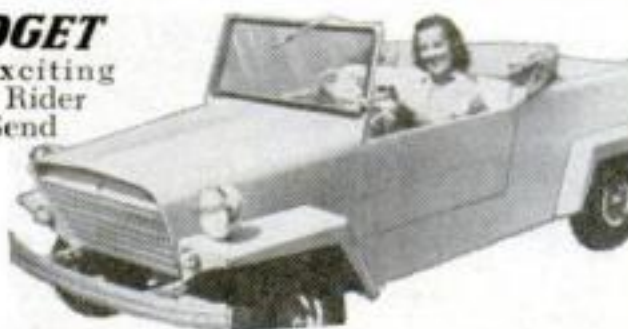
## Mr KING MIDGET

World's Most Exciting Lowest Priced Car. Rider Agents Wanted. Send

25c for 32 page picture book, full details, dealer price. Or send \$1 (refunded first order) for this plus Service and Repair Manual and 16 5x7 photos of car and factory.

**MIDGET MOTORS CORPORATION**

Athens 2, Ohio





World's greatest classified

# opportunities

80 DIFFERENT  
CLASSIFICATIONS . . .  
P. S. SELLS TO ALL

POPULAR SCIENCE MONTHLY  
355 LEXINGTON AVE.  
NEW YORK 17, N. Y.

Classified Ads only \$1.15 per word insertion, payable in advance. Minimum ad 10 words. To be included in September issue, copy should be in our office by July 20. No cancellations accepted after July 15. Address orders to O. K. Kelly, Classified Adv. Mgr.

## 1 AUTOMOBILES & MIDGET CARS

CROSLEY Parts—New—Used. Gene's, 1915 So. H. Ft. Smith, Ark.

NON-PROFIT organization offers automobile literature—old, modern, foreign; dealer books, service manuals, glossy photographs; free motor magazines. Write immediately, get on free mailing list. Auto Maniacs B. Box 451, Mt. Clemens, Mich.

HUGE Discounts—New Cars—Delivered—Terms. Details free. Steele, 7569 University, La Mesa, California.

CROSLEY or Foreign car parts catalogue. Parts discount club. Box 7, Elmont, New York.

## 2 AUTO SUPPLIES & EQUIPMENT

JEEP Parts! For Military and Civilian. At great savings. Largest inventory. Catalog for owners and dealers. Inquiries invited. American Auto Parts Co., 1830-PS Locust, Kansas City, Mo.

GREATEST Auto Parts catalog. Thousands racing and Restyling accessories for all cars. Only 25c (Refundable). Newhouse Automotive Industries, 5805PS7 Beverly, Los Angeles 22, Calif.

JUST Out! New 388-page, illustrated catalog offering savings up to 50 per cent on over 100,000 auto parts and accessories, many hard to get. All makes (1920 to 1960 models), trucks, foreign and sport cars. Also Hollywood accessories, custom styling, hi-speed equipment. Send 25c for postage, packing—refundable on first order. Whitney, 1919 PS-7 Archer, Chicago 16, Ill.

SILENCE Hydraulic valves. Free literature. Micro-Moly Products, Garrison 3, Kentucky.

PROTECT your Car with "Guardsall" Auto Alarm—\$3.00 Postpaid. Gene's Supply, 1915 So. H. Fort Smith, Ark.

AUTOMOTIVE repair manuals. Free list. Manager, Box 8715, Kansas City 14, Mo.

AUTO shop welding repair training in world's largest non-profit school. Low tuition. Free booklet. Hobart Welders, Box P-701, Troy, Ohio.

DO You Know What To Do When Your Car Stops On The Road? For "Secrets Auto Mechanics Never Tell" send \$1.00 to R.H.D., #2, P. O. Box 284, Elizabeth, N. J.

MODEL A Ford Parts List 25c. Matco, Box 135, San Pedro, Calif.

"RING-Valve Job" while driving. \$6.00 postpaid. Guaranteed!! Nothing like it!! Lasts 100,000 miles. Motaloy, Grantham 27, Penna.

MERRYMAN For Pistons Racing Over-sizes Older Models. Box 422, Ontario, Calif.

PROTECT Battery Terminals With Bat-R-Ez. \$1.00 Per Set Post Paid. Satisfaction Guaranteed. P. O. Box 1139, Sandusky, Ohio.

1909-1934 FORD Parts. Illustrated catalogue 50c. Mark Auto, Layton, New Jersey.

## USE THIS HANDY INDEX TO FIND WHAT YOU WANT

Advertising Agencies for Advertisers . . .	53
Agents Wanted . . .	43
Antiques, Relics & Indian Goods . . .	29
Astronautics . . .	5A
Authors Service . . .	52
Auto Supplies & Equipment . . .	2
Auto Trailers . . .	3
Automobiles & Midget Cars . . .	1
Aviation . . .	5
Boats, Outboard Motors . . .	11
Body-Building Courses, Jiu Jitsu, Etc. . .	12
Books & Magazines . . .	23
Business Opportunities . . .	37
Business Service, Information, Name Lists . . .	50
Buy It Wholesale . . .	38A
Cameras, Photo Supplies . . .	34
Camping Equipment & Tents . . .	16
Cartooning, Sign Painting, Chalk Talks . .	54
Coins & Currency . . .	26
Color Photo Finishing . . .	32A
Contests . . .	46
Detectives . . .	47
Diving Equipment & Training . . .	15A
Do-It-Yourself . . .	66
Dogs, Birds, Hamsters & Pets . . .	17
Educational & Instruction . . .	45
Electric Trains . . .	64B
Electrical Supplies & Equipment . . .	7
Enamels, Paints, Varnishes . . .	64A
Engineering Services . . .	60A
Engines, Motors, Etc. . .	10
Farms, Other Real Estate . . .	19
Field Glasses, Telescopes . . .	14
For Inventors . . .	60
Formulas, Plans, Etc. . .	39
Garden Supplies & Equipment . . .	10C
Geiger Counters, Treasure Finders . . .	77
Help Wanted Reports . . .	42
High-grade Salesmen . . .	44
Hobbies, Collections . . .	31
Home Craftsman . . .	65
Hypnotism . . .	24
Import-Export . . .	38B
Inventions Wanted . . .	61
Jokes, Games, Novelties, Etc. . .	24A
Language Outfits . . .	48
Live Bait . . .	18
Loans By Mail . . .	80B
Machinery, Tool Supplies, Etc. . .	9
Magic Tricks, Puzzles, Etc. . .	25
Minerals & Precious Stones . . .	30
Miscellaneous . . .	79
Models, Model Supplies . . .	64
Money-making Opportunities . . .	38
Motion Pictures, Slides, Sound Equip. . .	33
Motorcycles, Bicycles & Supplies . . .	4
Musical Instruments and Song Writers . .	35
Of Interest To Women . . .	70
Old Gold, Jewelry, Watches . . .	67
Personal . . .	80
Phonograph Records . . .	35A
Photo Finishing, Photocopies, Etc. . .	32
Plastics . . .	40
Printing, Multigraphing, Etc. . .	57
Printing Outfits, Supplies . . .	58
Profitable Occupations . . .	22
Radio, TV, Supplies & Equipment . . .	36
Remailing Service . . .	80A
Rubber Stamps & Office Supplies . . .	56
Science & Chemistry . . .	41
Special Services . . .	51
Sporting Goods, Guns, Fishing Tackle, Etc. . .	15
Stamp Collecting . . .	28
Tattooing Supplies . . .	75
Tobacco & Pipes . . .	68
Trigonometers . . .	9A
Typewriters & Office Machines . . .	55
Wanted to Buy . . .	72
Watch Repairing . . .	78
Wearing Apparel . . .	73
Welding, Soldering . . .	8

HOUSE power from car battery, transistorized plans \$1.00. Hanson, 112½ East Bowman, So. Bend, Indiana.

## 3 AUTO TRAILERS

TRAVEL Trailers, Camping Trailers (also plans, tent top, running gear, etc.). Tents (Galore!), Boats (finished—unfinished), Camping Equipment! Finest selection! Lowest prices! 25c for 1960 Catalog: Easy Camping, Inc., 128 Chicago, Evans-ton 3, Ill.

## 4 MOTORCYCLES, BICYCLES AND SUPPLIES

RECONDITIONED Motorcycle Motors. Chrome accessories. Complete stock Indian parts. Expert rebuilding. Fast service. Indian Motorcycle Sales, Kansas City 27, Missouri.

BMW Motorcycles, shaftdrive. U.S. Distributor Butler & Smith, Inc., 160 West 83 St., New York 24, N. Y.

WHIZZER motorbike \$15, Childs gasoline car \$15, Go cart \$35, Cushman \$35, Villiers engine \$5, Outboard motor \$6. (Mail order Only). Send 25c (35c for First Class Mailing) for 32-page Directory-Catalogue Number 96 listing these and hundreds of other bargains in midget cars, motorscooters, homebuilders parts, plans, etc. Midget Motors Directory, Athens, Ohio.

BICYCLE Supplies. American, Foreign; Postpaid. Attleboro Cycle, 619 County, Attleboro, Massachusetts.

## 5 AVIATION

HELICOPTER — Completely engineered, assembly drawings and parts available. Send \$2.00 for photo, 3 view drawings, specifications and design information. Send additional \$2.00 for book "Basic Helicopter Aerodynamics" uses our helicopter as example problem for performance, calculations. Helicopter Research Co., Box 121, La Mirada, California.

HOMEBUILT Helicopter Handbook \$1.00. Directory \$1.00. Urshan, 4332 N.P. Station, San Diego 4, California.

## 5A ASTRONAUTICS

ROCKETS. Design Method for Transonic and Supersonic Rockets. Government technique. Free Plans. \$1.50. AAPS, 47 Stevens Avenue, Jersey City, New Jersey.

## 7 ELECTRICAL SUPPLIES & EQUIPMENT

WHOLESALE Appliance Parts—Supplies Catalogue 25c. Seco, 26 South 20th Street, Birmingham 3, Alabama.

NEW electric cord lock connector for power hand tools. Saves time, saves money. Price \$1.35 Postpaid. Brown Novelty Mfg. Co., Big Stone City, S. D.

"MITIE Hotie" (wt. 3 oz.) chrome plated immersion heater, convenient for travel, home & office, boils cup coffee one minute, with elegant zipper pouch, \$2.85 postpaid. Wingfield Company, P. O. Box 2404, Memphis 2, Tenn.



# POPULAR SCIENCE OPPORTUNITIES

## 8 WELDING, SOLDERING

**WELDERS**, 110-220. Welds 1/4". \$39.50. Morris, 1070 Inner Drive, Schenectady, New York.

**BUILD** or buy efficient inexpensive 350 ampere welder. Guaranteed plans 25c. Free welder kit catalog. LeJay Manufacturing, Minneapolis, Minnesota.

**FREE** Catalog, welders, welder kits. Build 350-ampere welder using aircraft generator, plans 25c. Dunbar Manufacturing, Minneapolis 8, Minnesota.

## 9 MACHINERY, TOOL SUPPLIES, ETC.

**WOODWORKERS**—Free copy Homeshop Notes and Tool Catalog. Lee Tools, Box 8122P, Rochester 17, New York.

**10" POWER Hacksaw** \$48.50. Tools, pumps, electrical supplies, fan kits, air compressors. Big 3000 item catalogue 50c returned first order. Reynolds Company, Sharon 144, Massachusetts.

**BUILD** a vertical-horizontal drill press for 1/4" drill. Simple sturdy construction. No metal parts. Bore any angle with hairline accuracy. Simplifies doweling. Send \$1.00 for plans. Lawrence Spence, 326 Sylvan Ave., Leonia, New Jersey.

**FREE** New Catalog showing only complete line of work holding tools available anywhere. Drill press vises, angle and swivel machine vises, rotary tables, production and heavy duty angle vises, 68 different models, fully described with prices. Palmgren Products Co., 8366 South Chicago Ave., Chicago 17, Illinois.

## 9A TRIGONOMETERS

**ENGINEERS**, Draftsmen, Students: Tri-angulator Makes Trigonometry Easy. \$1.25. No C.O.D. Trical, Box 67, Buffalo 15, New York. Note: Price in this ad which appeared in April and May Popular Science was incorrect. Price should be \$1.25.

## 10 ENGINES, MOTORS, ETC.

**DIESEL** Injector Parts and Fuel Pumps Wanted GM51-53-71-110. Mayer, 7120 Carnegie, Cleveland 3, Ohio.

**ROTARY** Mower Parts Discount Catalog Free. Ellwanger's, 15 Canal, Port Jervis, New York.

## 10C GARDEN SUPPLIES AND EQUIPMENT

**SHARPEN** your own lawn mower blade with a patented balancer. Easy to use. Fits any rotary mower blade, preventing vibration of engine and insuring better grass cutting. \$2.00 ppd. Lawn Care Co., 812 S. 16th St., Decatur, Illinois.

**REPAIR** your own lawn mower. Our instruction brochure shows how to eliminate 85% of all engine troubles with minor adjustments. Also, blade balancing. \$1.00 ppd. Lawn Care Co., 812 S. 16th St., Decatur, Ill.

## 11 BOATS, OUTBOARD MOTORS

**NEW**, used, rebuilt marine motors. Marine conversions, fittings. Free Catalog. Stokes Marine Supply, Dept. 23, Coldwater, Mich.

**FULL** size, cut-to-shape boat patterns, blueprints, 7 1/2-38 feet. Big new 88 pg. illustrated "Build a Boat" Catalog of Naval architect-designed Catamarans, Cruisers, Runabouts, Skiffs, Outboard Boats, Sailing, Racing, Houseboats. 50c. "How to Build a Boat" Booklet, \$2.50. Cleveland Boat Blueprint Co., Dept. A-77, Box 1651, Cleveland, Ohio.

**SAVE! Save! Save!** World's Finest Boat Kits—25% less! Satisfaction Guaranteed! Write for free color catalog. Dept. PSM-760. Taft Marine Woodcraft, 636 39th Ave., N. E., Minneapolis, Minnesota.

**FRAME** Kits, Plans or full-size Patterns for 35 Inboards and Outboards. Prepared for Amateur Builders. New 80 page illustrative catalog—50c. Glen Marine, 9152 Rosecrans, Bellflower, Calif.

**MAG-Tool**... Like Magic. Perfectly adjusts 1951-1960 Outboard Marine Corp. products Magnetos in seconds. Precision machined for years of service. Save time, labor, money and guesswork for only \$8.50 postpaid. Dept. GA, L & M Machine Co., 5757 South Pennsylvania Ave., Cudahy, Wis.

## 12 BODY-BUILDING COURSES, JIU JITSU & ATHLETIC EQUIPMENT

**BUILD** powerful arms, chest, shoulders! 22 exercises, \$1. Fonsad, Box 601-C, 1100 Market, Wilmington 99, Delaware.

**"BIG** Muscles. The Quick Way." Dr. Young's revolutionary discovery. Free information. Gaucho, Box 9309-S6, Chicago 90.

**FREE** Muscle building information. Bodytone, Box 638A, North Miami, Florida.

**JIU** Jitsu. Fear no man, knives, guns or clubs. Ten official police holds overpower biggest bullies and thugs. Thirty-six secret "Karate" knockout blows without fists, etc. Amazing, easily learned home-study course. 40 lessons, 96 illustrations, copyrighted by world famous Military and Police Instructor. Complete \$1.00 postpaid. Jorgensen, Box 5082-570, Seattle 7, Wash.

**BARBELLS**. Exercise Equipment. Booklet, Health, Strength, Physique 10c. Reading Barbell Co., Reading, Pennsylvania.

## 14 FIELD GLASSES, TELESCOPES

**BINOCULARS**, Telescopes, Microscopes. Terrific values \$3.98 up. Request free money-saving catalog. Criterion, Dept. S-92, Hartford 1, Conn.

**WAR** Surplus bargains! Millions of lenses, instruments, telescopes, binoculars, components and complete line of astronomical telescope items. World's greatest optical market place! Send only \$1.00 for beginner's 10-lens kit and big instruction booklet Stock 2-CN. Write for catalog-CN Free! Edmund Scientific Co., Barrington, New Jersey.

**FREE** Catalogue! Thousands war surplus optical bargains. Lenses, Prisms, Telescopes, Binoculars, etc. Send \$1.00 for 10 Lens Hobbyist Set and Project booklet. G. Jaegers, 691 West Merrick Road, Lynbrook, New York.

**BINOCULARS**, telescopes, microscopes. Free catalog. National Optical Company, 505 New York Avenue, Union City, New Jersey.

**DYNASCOPE**—Amazing world famous reflector telescope. Request free brochure. Criterion, Dept. DS-74, Hartford 1, Conn.

**BUILD** your own Reflector Telescopes. Complete kits; Mirrors, Eyepieces, Tripods, all other accessories. Request free illustrated literature. Criterion Manufacturing, Dept. KP-57, Hartford 1, Conn.

**AMAZING** prices binoculars, telescopes. Folder, "Binocular Selecting", catalog Free. Dealers also write. Prentiss Importers, Mercury Bldg., West Los Angeles 25, Calif.

**REFLECTING** Telescope completely assembled. 60X. Guaranteed Observatory clearness. Free information. The Skyscope Co., P. O. Box 55, Brooklyn 28, New York.

**TELESCOPE** kits—direct from manufacturer. Other optical hobby kits. Large selection. Free booklet. Esco Products, Oakridge, N. J.

**TELESCOPES**, Binoculars—all sizes. Complete telescope makers supplies. Free catalog. Suffolk Science, Mattituck, New York.

**TELESCOPES**—refractor, reflector, kits and accessories. Free illustrated booklet. Dell Optics Co., Limited, Dept. PS, 329-55th Street, West New York, New Jersey.

**BARGAINS**. Binoculars, telescopes, microscopes. Free catalog. Adventure Sales Company, Box 2133, San Diego 12, California.

**ASTRONOMICAL** books, star-atlases, free list. Herbert Luft, 69-11 229th St., Flushing 64, N. Y.

## 15 SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY, TRAPPING

**100,000** PRODUCTS Wholesale — Free catalog! Send postcard: Econ-O-Mart, Whippany 16, New Jersey.

**FREE**... Wholesale Catalog. Beads, Spinners, Lure parts, Sinkers molds, Jigs, Reels, Finnyports, (PE), Toledo 6, Ohio.

**NOBODY** Undersells Klein's! Send 25c for 144 Page All-Sports Bargain Catalog. Klein's, Chicago 24, Illinois.

**154** PAGE catalog—a real "Dream Book" for fishermen! It's free! Netcraft Company, Dept. A-7, Toledo 13, Ohio.

**5000** GUNS, Swords, War Relics. Catalog 50c. Smith Museum, Runnemede, N. J.

**MOLDS** for Fisherman's Sinkers, Jigs, Squids, Casting and Spinning Lures. Free Catalogue. Sweet's Molds, Tonawanda 3, New York.

**CROSSBOWS!** Hunting—Bows! Factory Prices! Jayco, Box 1355, Wichita, Kansas.

**JAP** rifles altering American shells \$6.00. Jap shells \$3.95, catalog 10c. TP Shop, West Branch 10, Michigan.

**SKIN** Divers! Build your own underwater sea sled. Inexpensive to build and operate. Power driven—5 mph. Plans \$2. H & R Industries, Box 147, New Milford, Connecticut.

## 15A DIVING EQUIPMENT & TRAINING

**DIVERS**—Specialized training in advanced methods of construction, salvage and general commercial diving. Send for free brochure. Commercial School of Deep Sea Diving, Inc., 2301 E. Anaheim, Wilmington, Calif.

## 16 CAMPING EQUIPMENT AND TENTS

**CAMPING** Equipment, world's largest selection. Low prices. Send 25c (print name-address) for 160 page complete catalogue of Tents, Camping Equipment, national camp sites guide & camping handbook. Morsan Tents, 10-15G 50th Ave., Long Island City 1, New York.

## 17 DOGS, BIRDS, HAMSTERS, RABBITS & PETS

**RAISE** Rabbits on \$500 month plan. Free details. White's Rabbitry, Mt. Vernon, Ohio.

## 18 LIVE BAIT

**FREE** Literature. Big money raising fishworms and crickets. We teach you how to raise and sell. Special Today! Hybrid red wigglers, 3000—\$5.95, 5000—\$8.95, 10,000—\$16.95. Postpaid, with raising and marketing instructions. Carter Farm-12, Plains, Georgia.

**FREE** Picture Folder, "How to Make \$3,000 Yearly. Sparetime. Backyard. Raising Earthworms!" Oakhaven-121, Cedar Hill, Texas.

**AFRICAN** Nightcrawlers — 100 — \$2.00, 500—\$7.00 (Dealers Quoted). Ozark Worm Farm-V, Willow Springs, Missouri.

**RAISE** Nightcrawlers, Redworms Easy New Odorless Soilless Method. Mrs. Sherrell Gardner, Dresden, Tenn.

**FANTASTIC** Profits Raising Hybrid Redworms: Complete information covering all essentials of earthworm raising, including soilless method. Free. Special! 3,000 Redworms \$5.75, 10,000—\$16.75. Postpaid. Satisfaction Guaranteed. Georgia Worm Farms, Dawson 23, Georgia.

## 19 FARMS, OTHER REAL ESTATE

**FLORIDA**—Nice homesites, \$345 at \$10 monthly. Folder Free. Winfree Vernor, DeLand, Florida.

**STROUT** Catalog—Free. Farms, Homes, Businesses. 3,665 Bargains described. 36 States. Coast-to-Coast. 60 Years Service. Strout Realty, 251-ZB Park Ave. South, New York 10, N. Y.



**CANADIAN Vacation Lands:** Full price \$285.00, 40 acres, \$10.00 month. Suitable cottage sites, hunting, fishing, investment. Free information. Land Corporation, 130D Shaftesbury, Downsview, Ontario, Canada.

**FIFTY Beautiful Lakes** in the longleaf pines on Carolina Coast Near Wilmington. Ideal climate. Best fishing, hunting, swimming, boating. 25 square miles private recreation area. Special sections trailers, campers. Low living costs. Special introductory offer: Only \$350 for large, level, high, dry, shady homesite, 70x150. \$5 down, \$5 monthly. No interest. Free literature. Charles Pratt, Fifty Lakes, Southport 2, N. C.

## 22 PROFITABLE OCCUPATIONS

**FREE Picture Folder**, "How to Make \$3,000 Yearly, Sparetime, Backyard, Raising Earthworms!" Oakhaven-7, Cedar Hill, Texas.

**VENDING Machines—No Selling.** Operate A Route of Coin Machines and Earn Amazing Profits. 32-Page Catalog Free. Parkway Machine Corporation, Dept. 17, 715 Ensor Street, Baltimore 2, Maryland.

**FREE Literature — Make Big Money Raising Fishworms and Crickets.** Carter Farm-10, Plains, Ga.

**190 FRANCHISE Opportunities** in New Franchise Directory. \$2.00 postpaid. Pilot, 42 West 33 St., New York 1.

**BECOME independent** with your own franchise business. Thousands earning handsome incomes. Request interesting facts today. National Franchise Reports, PS-528, 333 North Michigan, Chicago 1.

**HUSBANDS & Housewives Wanted!** Big money. Spare or full time cake decorating and candy making. Turn your kitchen into a gold mine. No age, education limits. Complete instruction, learn and earn at home. Write for free facts: Candy And Cake, Dept. 713, Fallbrook, California.

**REPAIR Hydraulic Jacks—For Details** Write: Hydraulics, Box 4104, El Paso, Texas.

**FREE Book "990 Successful, Little-Known Businesses."** Work home! Plymouth 5G, Brooklyn 4, New York.

**BIG profits.** Realistic plastic flowers. Postpaid. Meridian Exports, Hollydale, California.

**SHARPEN—scissors, pinkers—inexpensively.** Clipper sharpener. Supplies. Blackhawk, Sheldahl, Iowa.

## 23 BOOKS & MAGAZINES

**GOOD Used Books, 50c-\$1.** Free Lists. Editions, Dept. PS, Hempstead, New York.

**BRITISH Book Bargains.** Any subjects. Catalogues free. Transbooks, Wantagh 77, New York.

**"BEAT Talk" — Swingin' Dictionary.** Clever illustrations. Squirrels, get into orbit! One Skin (\$1.00), Studio Press, 200-M Howard Building, Tulsa, Oklahoma.

**MAGAZINES Wholesale-Retail catalogue** 10c. Backdates, 1181 East Lombard, Baltimore 2, Maryland.

**SCIENCE-Fiction Book Bargains.** List Free. Werewolf Bookshop, Verona, Pa.

**100,000 BOOKS—10c Each!** Astonishing Subjects! Free Catalogs Titles! "Bargains", 1323-MZ Chaparral, Corpus Christi, Texas.

**UNUSUAL — Sensational Books — 10c Each!** Every Subject! Catalogs Free! Mailway, Box 124-PS, Stuyvesant Station, N. Y. 9.

**BOOKHUNTERS: All Subjects.** Send Wants! Jaher Book Service, 183 Hazelwood Drive, Westbury, New York.

## 24 HYPNOTISM

**HYPNOTIZE Self, Others while asleep** with amazing hypnotic phonograph records, tapes. Catalog free. Research Association, Box 24-G, Olympia, Washington.

**FREE Illustrated Hypnotism.** Selfhypnosis Catalogue. Write: Hypnotist, 8721 Sunset, Hollywood 46P, California.

**FREE Catalog! Hypnotism, Autohypnosis!** Books, Tapes, Records! Drawer PS697, Ruidoso, New Mexico.

**WORLD'S largest catalog free.** Merlin Enterprises, 1244 Lincoln Avenue, San Jose, California.

**XRAY Mind! Hypnotize, one glance.** Guaranteed \$3.00. Wamsteker, Box 10, Ottery, Cape, South Africa.

**HYPNOTIZE unnoticed, quickly, effortlessly or refund!** \$2. Retnim, Box 244, Cedarburg, Wisconsin.

**HYPNOTISM.** Selfhypnosis. Guaranteed home study courses. Diploma issued. Free brochure. School Hypnology, 135C Central Park West, New York 23, N. Y.

**"HYPNOTIZE . . . One word . . . One fingersnap."** on stage. Satisfaction—or refund. \$2. Hypnomaster, Box 9309-S6, Chicago 90.

**"HYPNOTISM Explained."** 64 page book—15c. Bookmaster, 1843 Harte, San Jose 3, California.

**AT Last! New book really teaches** how to achieve self-hypnosis, how to use it. Free literature. McKinley Publishers, Dept. 7, Box 3038, San Bernardino, Calif.

**"THE Truth About Hypnotism",** A 24 Page booklet containing facts all should know. Answers all questions commonly asked. Send only \$1.00. Hypnotic Research Institute, 437 John St., Bridgeport 3, Connecticut.

## 24A JOKES, GAMES, NOVELTIES, ETC.

**3100 NOVELTIES, Jokes, tricks, gadgets, funmakers, hobbies.** Big catalog 10c. Johnson-Smith, D-497, Detroit 7.

**GET 12 for \$1.** Rabbit feet, Attractive colors, Excellent party gift. Brand, 154 W. 27th, New York 1, N. Y.

## 25 MAGIC TRICKS, PUZZLES, ETC.

**WORLD'S finest professional magic** Joker novelties. Giant illustrated catalog 10c. Top Hat, Evanston 13, Illinois.

**WIN, Dice, Cards.** Catalog 10c. Book, Box 671, St. Louis 1, Missouri.

**BIG 160 Page Professional Magic Catalog!** World's greatest collection of over 1000 Tricks, Jokes, Magic, Illusions, Secrets, Mysteries! 10c brings catalog and free trick. House of 1000 Mysteries (Dept. PS7C), Trumbull, Conn.

**TERRIFIC Telephone Trick.** Instructions 25c. Shelly Publications, P. O. Box 201, Brightwaters, New York.

**500 TRICKS, Famous Douglas 120-page** catalog number 33 now available. Complete catalog—magic tricks—equipment just 10c. World's fastest service. Magicland, Dept. 24, Box 274, Dallas, Texas.

**3000 TRICKS, pocket, parlor, stage.** World's Finest Magic Catalog (408 pages). \$2.50. Kanter's, S-1311 Walnut, Philadelphia 7.

**MONEY, win, never lose with trick** cards, set \$1.00. Cards Co., (Dept. S2), 9655-107 A Ave., Edmonton, Alta.

## 26 COINS & CURRENCY

**FREE List! U.S. Coins.** Lowest Prices. Hugh's Coins, Hickory, North Carolina.

**NUMISMATIC'S Largest Newspaper.** Semi-Monthly. Sample 25c. \$2.00 Yearly. Numismatic News, Washington Street, Iola, Wisconsin.

**INDIAN Head cents, two different only** 15c. Approvals. Littleton Coin Company, Littleton R2, New Hampshire.

**SIX Different Indian Cents \$1.00; Free** Discount List. Collector's Bargains, Box 66A, New Hope, Penna.

**WOWIE! Indian Cent, Foreign Coin,** Bargain Lists 10c. Hutchinson's, Box 4747, Philadelphia 34, Penna.

**RAREST CC Mint Dollar, 1885 Unc.** \$10.00. 100 Pg. Illustrated Catalogue 50c. Shultz, Salt Lake City 10, Utah.

**COIN Magazine, 200 pages.** Sample 50c. Numismatic, 7320 Milwaukee, Chicago 31.

**LIBERTY Nickels 6 different \$1.00.** Price List 10c. R&M Coins, Delanco, New Jersey.

**LINCOLNS, 50 different, good to very** fine in coin folder, \$3.00. Newell Service, Box 1169, Evanston, Illinois.

**LINCOLN Cents: 1927-S-D, 1924-S,** 1921-S, 1919-S-D, 1920-S-D, 1930-S-D, 1955-S, 1917-S-D, 1918-S-D, 1925-S-D, 1909-P, 1938-S-D, 1928-S-D, 1929-S-D, Good to Fine. Complete lot only \$2.95. Berry, Box 306, Westminster, Calif. Price list 25c each.

**32 PAGE U.S. coin list 10c.** Contains almost 100 illustrations; over 5,000 delightful bargains. Stoney, 260 Washington, Boston 8, Mass.

**BEAUTIFUL Pope John Set \$19.50; Set** without Gold \$4.95. Official Alaska, Hawaii Medals—each \$4.50. 1960 Proof set \$3.95. Your name in Gold on 1961 Guidebook \$2.25; Canadian Guidebook \$2.00. World's Greatest 96-page Bargain Catalogue \$1.00. Bebee's, 4514 North 30th, Omaha 11, Nebraska.

**FREE Bonus Offer! U.S. Bargain List,** 10c (refundable). Economy Sales Company, Mansfield, Massachusetts.

**SIXTEEN page 1960 retail price list** of U.S.A. and Canadian coins for 10c. Our selling prices on thousands of coins and coin collectors supplies. Bryson Incorporated, 612B White, Toledo 5, Ohio.

**5 BRILLIANT foreign coins, 5 brilliant** Lincoln cents, and 5 Canadian Cents \$1.00. Lists Free. Joray's, Shouns, Tenn.

**OLD Money Wanted.** Will pay \$1,000.00 for 1894 Dime, S. Mint. \$5,000.00 for 1913 Liberty head nickel (not Buffalo). Big premiums paid for all rare coins. Send 5c for Large Coin Folder. May mean much profit to you. Numismatic Co., Box 750-R, Costa Mesa, California.

**GET Profit And Pleasure** in collecting old coins. Send 25c for 68-page illustrated coin catalog. You'll be delighted with it. Send for it now. B. Max Mehl, Box 750-C, Costa Mesa, Calif. Oldest rare coin establishment in U.S. Established 50 years.

## 28 STAMP COLLECTING

**UNITED States commemorative collection** containing 33 different—10c. Approvals. White, 516-W Avenue L, Brooklyn 30, New York.

**307 WORLDWIDE different stamps only** 25c. Approvals. Niagastamp, St. Catharines 672, Ontario.

**25 DIFFERENT large American Commemorative** 10c. With approvals. Linstamp, St. Catharines 619-A, Ontario.

**AMAZING Offer! 200 U.S. stamps—**including commemoratives, airmails, high denominations to \$1.00—only 10c to Approval Applicants!! Illustrated Bargain Lists free. Mystic Stamp Co., Dept. 55, Camden, New York.

**103 DIVERSIFIED British Colony Stamps** only 10c. Approvals. Niagastamp, St. Catharines 672-A, Ontario.

**102 DIVERSIFIED Worldwide stamps** 10c. Approvals. Linstamp, St. Catharines 619, Ontario.

**1000 DIFFERENT Worldwide Stamps** \$1.00. Valued over \$20.00. Universal, Box 6, Kenosha 6, Wisconsin.

**INTERESTING Worldwide Animal stamp** collection 10c. With approvals. Niagastamp, St. Catharines 672-B, Ontario.

**WORLDWIDE, 50 all different, absolutely** free, just to introduce our incomparable approvals. Kent Stamp Company, GPO Box 87, Brooklyn, New York.

**100 DIFFERENT Stamps, 10c with** approvals. Smith, 508U Brooks, College Station, Texas.

**FREE! Liberia Airmail Triangle, Dia-**mond, Midget, Mammoth to approval buyers. Plymouth, Dept. A-2, Bell, California.



# POPULAR SCIENCE OPPORTUNITIES

**TWO \$5.00 United States Stamps, twenty others 10c with United States approvals.** Irwin, Box 1109, Brooklyn 30.

**FREE! \$1.00 worth, your choice, from first selection. No Strings! Adults Only.** Rush request now. Philatelics, Dept. TP, New Paltz, New York.

**508 DIFFERENT** World-wide from Formosa, Morocco, Indonesia, etc., cataloging over \$15.00, only 35c. Offer to Adults Only. Approvals. Littleton Stamp Company, Littleton Q2, New Hampshire.

**NUDES set (4)—Unusual Approvals 10c.** Atlas, Eisenhower, Racine, Wisconsin.

**ALBUM! Hundreds of Spaces! Only 10c.** Postpaid! Stampmart, Hartford 1, Connecticut.

**225 STAMPS** For only 10c! This mammoth value includes Airmails, Pictorials; stamps from strange Countries cataloging up to 25c each! Also Approvals. Mystic Stamp Company, Camden 55, N. Y.

**WOW! 110 All Different Germany 10c** Zeppelins, Semi-Postals, Airmails, High values, etc. Giant Catalog, bargain lists included with beautiful approvals. Jamestown Stamp, Dept. A70PS, Jamestown, N. Y.

**EXCEPTIONAL 125 different, cataloging \$3.00, includes triangles, commemoratives, 10c, approvals.** Reeves, Box 37597P, Miami 37, Florida.

**FANTASTIC Fish Triangles!! Valuable "Ben Franklin" on Canal Zone!!** Flaming bi-colored Volcano Triangle!! Lovely Olympics Triangle!! Plus Icy Greenland, Weird Wild Beast issue and others, 10c with approvals. Ozark Stamps, Spring Lake 10, Michigan.

**10 POUNDS U.S.A. Mixture—\$3.75 plus postage.** Utechs, 1143A North Keeler, Chicago 51.

**DIAMOND Roosevelt, Pope, Triangle, Greenland, Angola, 51 others 5c.** Approvals. Longhorn, Box 3068P, Lubbock, Tex.

**GIGANTIC Collection Free—Includes Triangles—Early United States—Animals—Commemoratives—British Colonies—High Value Pictorials, etc.** Complete Collection plus Big Illustrated Magazine all free. Send 5c for postage. Gray Stamp Company, Dept. PR, Toronto, Canada.

**VATICAN Coronation Souvenir—Pope John XXIII card and 10 attractive stamps in protective plastic folder.** Story of Vatican and coronation on reverse. A beautiful addition to any collection. 25c with approvals. Capital Stamp Co., Ferrysburg 10B, Mich.

**U.S. Stamps. Giant Discount Catalog—20c.** Raymax, 37-VX Maiden Lane, NYC 38.

**50 DIFFERENT stamps free! Approvals.** Marford, Box 48, Queens Village 29, New York.

**105 DIFFERENT U.S. stamps 25c.** Approvals included. Shelton, Box 907-P, New York 8, N. Y.

**90,000 STAMPS: Bargain lot, hundreds stamps \$1. Extra special better stamps \$2.** Giant assortment \$5. High value packet \$3. Samples—something different 31c. Persile, 436 New York Ave., Brooklyn 25, N. Y.

**WILL Rogers Air! Helicopter Triangle!! Plus Monte Carlo Dove Triangle! Stamp printed in Solid Gold! New York Empire State Bldg. airmail, lovely Congo Orchids in full colors, etc. 10c with approvals.** Sunny Stamps, Apopka 10A, Florida.

**FLOWER Triangle Set!! 100 others, all different, 10c.** Approvals. Lehigh Stamp Service, 41 North Third, Easton, Penna.

**BARGAINS—Worldwide new issues. Illustrated Bulletins.** Importer, 6752 So. Campbell, Chicago 29, Illinois.

**FREE! Giant Bargain Catalog—New Edition listing thousands of bargains including U.S. and B.N.A. stamps, packets, mixtures, albums, accessories and supplies; sent with beautiful approvals.** Jamestown Stamps, Dept. E70PS, Jamestown, N. Y.

**FREE! Collection, 50 different Portugal and Portuguese Colonies; including Angola, Mozambique. Colorful, inexpensive approvals.** Send 10c for mailing. Elkhart, Box 33, Elkhart, Indiana.

**ADULTS! Like Stamps? Start your own approval business.** Our free guidance shows exactly how, makes it easy, profitable. Details Free. Columbia, 45-09-SP Broadway, Long Island City, New York.

**MYSTERY Bag Stamp Collection, Only 10c.** Hill Company, Box 51, Defiance, Ohio.

**GIANT Approvals Thousands Different 1c and 2c each.** Wahl's Stamp Exchange, 7008K Farragut, Chicago 31, Ill.

**100 OLD U.S. Stamps between 1861 and 1935 \$1.00.** Rousch Stamps, 51 Chestnut, Mansfield, Ohio.

**FREE Sample! Interesting, Informative, Illustrated.** National Stamp News, Anderson, South Carolina.

**SENSATIONAL Mix World Wide Over 500 Top Quality, \$1.00.** Broadway Stamp, 1220 Broadway, Yakima, Wash.

**U.S. Mint Flag set, complete, \$1.00.** Free list. Brooks, 2323-T Avenue X, Brooklyn 35, New York.

**PENNY Approvals jammed with Bargains.** For better values, try Putnam Stamp Company, Mahopac, New York.

**OLD scarce U. S. seconds on approval.** Slightly defective, bargain prices. Hearnfeld, Clintonhill Station, Newark 8, N. J.

**FREE! Triangles, Pictorials, Others, 55 Different.** Colorful, Unusual Approvals. Baird, Box 8113, Portland 7, Oregon.

**FREE! Pictorial stamp packet.** Request approvals. Dancer, B75-T9, Mansfield, Ohio.

**300 DIFFERENT 25c with foreign approvals.** Robert K. Bedford, Box 6111, Minneapolis 24, Minnesota.

**U.S. Plate Block Approvals.** Kuehl, 3125 East K, Tacoma 4, Wash.

**BUY Stamps at wholesale! Save, make money! Details free.** Adults only. Columbia, 45-09-SC Broadway, Long Island City, New York.

**WHEN writing to advertisers, please mention Popular Science.**

**TRADE your duplicates toward our approvals! (Foreign only.)** Complete information. 10c. Variety Stamps, Box 98-S, Newton Highlands 61, Massachusetts.

**10 BEAUTIFUL Mint British Colonies 10c with approvals.** Bennett, Candor 2, N. Y.

**25 DIFFERENT Commemoratives 1893 up 10c.** U. S. Approvals. K & B, Box 70, Brooklyn 23, N. Y.

**U.S. Bargain 53 different 10c, with U.S. Approvals.** Stamps, Kennebunk, Maine.

**14,000 DIFFERENT! Amazing new plan builds your collection systematically, country by country.** Only 50c weekly. Free details. L. G. Ware, Stepney 70, Conn.

**FREE! Surprise packet with approvals.** Chamberlain, Box 113, Hesperia, California.

**NUDES, 10 Undraped, Partially Draped People On Stamps.** Two Dimes. Approvals. Stamps Farm, S1-23, Oxford, Wisc.

**1000 DIFFERENT Worldwide, \$1.00.** With approvals only. Jacobsen, Crompond, New York.

**PRICE List U.S., Foreign. No Approvals.** Allen, 5000 Miami, St. Louis 9, Mo.

**PENNY Approvals! Regardless Catalogue!** Kloster, 4164—52nd Ct., San Diego 5, California.

**BIG U.S. Price List Free!** Bailey, 45-H Bromfield, Boston, Mass.

**TERRIFIC Value, Eight Complete Mint Sets 10c With Approvals.** Beaties, 58 Glenagar, Islington, Ontario, Canada.

**5 DIFFERENT U.S. Dollar Value Stamps Only 25c With Approvals.** William Rice, 87 Washington Ave., Kingston 2, N. Y.

## 29 ANTIQUES, RELICS & INDIAN GOODS

**SELLING 100,000 ancient Arrowheads, Spearheads, Tomahawks, etc.** List free. Lear's, Glenwood, Arkansas.

**FOUR Arrowheads \$1.00. Two Spearheads And Hatchethead \$2.00.** Knife, Drill, Scraper \$1.00. Palmer, 435 Washington Road, McKeesport, Penna.

## 30 MINERALS & PRECIOUS STONES

**EARTH Science—Rockhounds National Magazine.** Subscription \$2.50. Sample 35c. Box 1357-PS, Chicago (90), Ill.

**"GEMS & Minerals Magazine,"** largest rock hobby monthly. Field trips, "how" articles, pictures, ads. \$3.00 year. Sample 25c. Box 687S, Mentone, California.

**PAN Gold—in the southern Appalachians—make your weekends profitable; completely illustrated guide—handbook—\$3.00.** "Appalachian Gold", Erwin, Tennessee.

**BEAUTIFULLY Cut Australian Fire Opal! \$2.00.** Rough \$2.00 Ounce. Free List. Western Gems, 20385 Stanton, Castro Valley, California.

**ROCKHOUNDS—Gem Cutters—Jewelry Makers . . . new Free catalog—just off the press!** Biggest supplier to hobbyists and craftsmen offers you tools, materials, equipment, introductory bargains and know-how. Free catalog . . . Write Grieger's, Dept. C-13, 1633 E. Walnut, Pasadena, California.

**FREE bargain gem list.** Lapidary and silversmith catalog, 56 pages, 25c. O'Brien's, 1116 N. Wilcox, Hollywood 38, Calif.

## 31 HOBBIES, COLLECTIONS

**INVENTING can be an interesting and profitable hobby.** Write for complete particulars. Institute of American Inventors, Dept. 30-E, 635-F St., N.W., Washington 4, D. C.

**AMAZING Introductory offer: 10 different foreign military emblems only \$1.50; 30 different countries, special \$3.75; Foreign medal catalog 25c; American catalog 25c.** Insignia Club, 550-A Fifth Avenue, New York.

**OFFERED first time in North America, world famous trick cards.** Set \$1.00. Cards Co., (Dept. S3), 9655-107 A Ave., Edmonton, Alta.

**WANTED—Cigarette, tobacco cards.** Write Charles Bray, East Bangor, Pennsylvania.

## 32 PHOTO FINISHING, PHOTOCOPIES, ETC.

**A Triple Value—Quality, Price, Service.** Color or Black & White, 12 exp. (Black & White)—59c. 20 Gift Photos—\$1.00. Holiday Photos, Dept. 17, Box 666, Denver, Colo.

**A 3-in-1 Value—Price, Quality, Service.** 20 Gift Photos—\$1.00. 12 exposure rolls (Black & White)—59c. Color or Black & White. Interstate Photos, Dept. 12, Box 15, Aurora, Ill.

**TWELVE Exposure rolls 49c.** Wallets 20 for \$1.00. Lincoln Studios, Dept. L, Box 13, Lincoln, Nebr.

**SAVE On Photo Service.** Kodacolor 8 Exposure Roll—\$2.50. 12 Exposures—\$3.50. Reprints 25c. Black and White 8—50c. 12—70c. Reprints—5c. Fast Kodachrome, Ektachrome and Anscochrome Processing. Free Mailers and Price List. Save on Photo Service, Box 50, Watertown, Wisconsin.

**INTRODUCTORY Special.** Processing Kodachrome 8mm movie or 35mm 20 exp. \$1.00. Kodacolor 8 exp. complete \$2.00; 12 exp. \$3.00. Black and white 8 jumbos 40c. Jumbo reprints 5c. Quality guaranteed. Prompt service. Write for free mailers. Fast-X-Foto, Dept. PS-7 Box 7A, Jersey City, N. J.

**SIX 3½x5 Portraits in Art Folders** from one negative or picture. \$1.20. Quality Photography, Hutchinson, Kansas.

**ENLARGEMENTS! Eight 5x7's or Five 8x10's** from negatives, \$1.00. Wilart, Box 975, Little Rock, Ark.



# POPULAR SCIENCE OPPORTUNITIES

## 32A COLOR PHOTO FINISHING

**KODACHROME**-Ektachrome Guaranteed Kodak Processing-Prompt-8mm or 35mm 20 exp. \$1.40. Free List-Mailers. Color Pix. Dept. S. CPO Box 30, Kingston, N. Y.

## 33 MOTION PICTURES, SLIDES, SOUND EQUIPMENT

**MOVIE** Camera Film 8 mm roll \$1.50. 16mm 100' \$3.00. Free processing. Better Films. 742 New Lots, Brooklyn, N. Y.

**MOVIE** Film! Free catalog! Eso-H, 47th Holly, Kansas City 12, Mo.

10c **BRINGS** big new Cine Manual for the 8mm-16mm Movie Maker. Save \$\$\$ on fresh B&W and Color Movie Film, all Home Processing Equipment. Superior, 442-448 N. Wells, Chicago 10.

16MM Sound shorts. Tremendous assortment of features. \$15.50 up. Used 16MM sound projectors, \$79.50 up. Catalog. Abbe Films, 417 West 44th Street, New York 36, PLaza 7-2219.

**TAPE** recorders. Hi-Fi components. Sleep Learning Equipment, tapes. Unusual values. Free Catalog. Dressner, 69-02 174 Street, Flushing 65, New York.

**FREE** every month—Blackhawk's newspaper-size catalog 8mm, 16mm movies, 2"x2" color slides. Biggest selection in USA. Bargains in used 16mm sound films, projectors. Blackhawk Films, Davenport 15, Iowa.

**FREE** Catalogues. 5,000 8-16MM Films. International Films, Greenvale, New York.

**HI-FI** Components. Recorders. Free Wholesale Catalogue. Carston, 125-J East 88, N.Y.C. 28.

**SEE** the World in Color. 8mm-16mm. Kodachrome movies. Alaska, Hawaii, America, Europe, Africa, South Seas, U.S. National Parks. Also War and Rocket Test films. 185 subjects. Low prices. Write World in Color, Box 392-PS, Elmira, N. Y.

**HOLIDAY** Travel Slides. Send 25c for complete illustrated catalog of 35mm science, travel, sports, education and title slides, shipped on approval. Catalog charge refunded on first order. Quantity discounts. P. O. Box 10PS, Toledo, Ohio.

**SOUTHSEAS**—2X2 color slides. Eight for \$1.00. Sample, Catalogue, 20c. Avery, Box 8261, Waikiki, Honolulu, Hawaii.

**ARMCHAIR** Adventure. Visit Michigan's Water Wonderland through beautiful color slides. Set of 3 for \$1.00. 6 for \$2.00. Spartan Color, Box 401, Grand Rapids, Michigan.

## 34 CAMERAS, PHOTO SUPPLIES

10,000 **PHOTOGRAPHIC** Bargains! Anything & everything photographic. Still, Movie, equip. etc. New or Used. Send postal. Box 193-ZB, Peabody, Mass.

**PHOTOGRAPHY** for pleasure or profit. Learn at home. Practical basic training. Long established school. Free booklet. American School of Photography, 835 Diversey Parkway, Dept. 172B, Chicago 14.

**CAMERAS**, Film, Projectors—Discounts to 40%. Catalog Free. Photo Distributors, Box 4203S, San Diego 4, Calif.

164 **PAGE** Photographic Bargain Catalog, listing thousands of photographic bargains. Send 25c for your copy, credited on first order. Dept. 4-C7, Central Camera Company, 230 So. Wabash Ave., Chicago 4, Illinois.

**NATIONWIDE** Female Model Directory \$3.00 Postpaid. Quaker Company, Rehoboth, Delaware.

## 35 MUSICAL INSTRUMENTS AND SONG WRITERS

**SONGPOEMS** and lyrics wanted. Mail to: TinPan Alley, Inc., 1650 Broadway, New York 19, N. Y.

**SONGWRITERS**: Recording Company Wants new songs. Royalty basis. National sales, promotion if selected. No charge for melodies. Send material. Music Makers, Dept. G-61, 8344 Melrose, Hollywood, California.

**SONGWRITERS!** Protect your ideas! Hold all poems, songs! Write for safe, correct procedure! Song Service, Dept. PS, 333 W. 56th, New York 19.

**POEMS** Wanted for musical setting and recording. Send poems. Free examination. Crown Music Company, 49-P West 32 Street, New York 1.

**POEMS** Needed Immediately for New Songs and Records. Free Examination and Appraisal. Send Poems: Songcrafters, Acklen Station, Nashville, Tenn.

**SONGWRITERS**, with publisher contacts, want song ideas. Share royalties. No fees. Send poems: Songwriters' Associates, 1650 Broadway, New York 19-F.

**PROFESSIONAL** service for amateur songwriters. Colonna Enterprises, Box 888, Burbank, Calif.

**GUITAR** Making, books, plans, imported woods, tools. List 10c. Wildwood, 510 East 11th Street, New York 9, N. Y.

**SONGS** Into \$\$\$\$\$\$—Share \$33 million dollars yearly for New Songwriters. Song-poets. Any subject, songs composed, published, promoted by largest firm. Information, appraisals Free. Send Nordyke Music Publishers, 6000 Sunset, Hollywood 28PS, California.

**ELECTRIC** Guitars, amplifiers, wholesale. Free catalog. Carvin, PSM, Covina, California.

**BUY** Accordions—Organs direct from importer. Big Savings. 5-day trial. Free color catalog. Dept. PS8, Accordion Import Center, 7130 Galli Drive, San Jose, Calif.

## 35A PHONOGRAPH RECORDS

**PARTY** Records. Sample record and catalog \$1.00 postpaid. Hollywood Jokers, Dept. 7, P. O. Box 1986, Hollywood 28, California.

**THE** Record Collector Journal, valuable data, sales mart. Introductory six issues. \$1.00. Record Research, 131 Hart, Brooklyn 8, New York.

**RECORDS**, Stereo, Monaural, Big Discounts. Write Noelsson, Box 211, New York 5, N. Y.

**PHONOGRAPH** Records cheap, postpaid. Catalogue. Paramount, Box 2026-S, Pine Castle, Florida.

## 36 RADIO, TELEVISION, SUPPLIES & EQUIPMENT

**RADIO & TV** Tubes at Manufacturers Prices! 100% Guaranteed! Brand New! No re-brands or pulls! United Radio, Box 1000, Newark, New Jersey.

**QUALITY** Crystal Diode Radios, assembled, \$2.00. Money Back Guarantee. Electro-Mechanical Company, Springboro, Ohio.

**STEREO** in Your Car Book \$2.00. Free Radio Folder. Ekeradio, 650 North Fair Oaks, Pasadena, California.

**FIX** Your Own TV. Save 80%! Send for Free Illustrated Chart showing how! We'll include Giant Electronics Catalog. Zalytron, 220-S West 42nd Street, NYC.

**FREE!** Giant wholesale catalog on electronics, hi-fi, transistor, scientific, hobby, optics, photographic, housewares, jewelry, tools, novelties, toys. Write: Lektron, 1318 Everett Ave., Chelsea 50, Mass.

**ELECTRIC** Guitars, amplifiers, wholesale. Free catalog. Carvin, PSR, Covina, California.

**GOVERNMENT** Surplus Snooperscopes, Ham Gear, Mine Detectors, Parabolic Reflectors, Telescopes. Picture Catalog 10c. Meshna, Malden 48, Mass.

**TRANSISTOR**—New, Amazing and pocket size too. Plays like big radio. Limited supply. Now only \$11.95. Send to: L. W. Bymaster, 820 W. Jefferson St., Rockford, Illinois, U.S.A.

**SAVE** 100%—7 tube FM-AM radio \$29.95 postpaid, free catalog. Dept. EI, Wingfield Co., Box 2404, Memphis 2, Tenn.

## 37 BUSINESS OPPORTUNITIES

**MAIL** Order Franchise. No experience needed. Spencer Gifts, a well-established and successful mail order firm, puts you into business. Supplies catalogs with your own name imprinted. No investment in stock. No shipping merchandise. Catalog items pre-tested for salesability. Initial investment of less than \$50 can get you started. Write for Free information kit. Spencer Gifts, CJ-2 Spencer Building, Atlantic City, N. J.

**YOUR** Own Import Mail Order Business! Deal with over 400 manufacturers, exporters of the world. Complete Import procedures, international drop-ship methods. Capital unnecessary. Free details. Associated, Box 2068-P8, Sioux City 4, Iowa.

**YOUR** envelope addressed accurately, reasonably. Fast service. We have capable addressers in your city. Glenway System, Box 6568, Cleveland 1, Ohio.

**\$70 WEEKLY**—Home, spare time. Simplified mail bookkeeping. Immediate income—easy! Auditax, 34757D, Los Angeles 34.

**FIX** Typewriters. Free Repair Course. Home operated. Remit 25c for book explaining Free Course and Agency Appointment. Athey, Tarentum, Pa.

**GROW** Orchids at home. Profitable, fascinating. Successful home grower explains special light, temperature and humidity conditions orchids need. Free—Full details. Orchids, 100 S. Vermont, Los Angeles 4.

**MAKE** Extra Money—Big Cash Commissions plus premiums for you and your customers. Sell Advertising Book Matches—sensational new Tenorama, Glamour Girls, Hillbillies; dozens others. All sizes—Quick daily sales; big repeat business. Free Master Kit makes selling easy—no experience necessary. Superior Match, Dept. PX-760, 7530 Greenwood, Chicago 19, Illinois.

**FREE!** Name Brands Catalog! Your own high profit business. Sell Name Brands, full or part time. No inventory—no investment. More than 2000 Name Brand items; lowest wholesale prices. Watches, jewelry, cameras, hi-fi, stereo radios-phonos, appliances, housewares, hardware, power tools, luggage, musical instruments, garden equipment, sporting goods, toys, many others. 8 Floors of Name Brands. Million dollar inventory. Orders shipped complete within 24 hours. Send for Free beautifully illustrated catalog Now! Separate wholesale price list. H. B. Davis Corp., Dept. 14, 145 West 15 St., New York 11, N. Y.

**BRONZE** Baby Shoes: Instructions, Equipment and Mountings for genuine Electroplating Process. Largest Supplier of all Plating Equipment. Supplies. Free Catalog. Hollywood Bronze Supply, Dept. B-1, 1624 East First, Los Angeles 33, California.

**OPERATE** profitable mail order business. Write Walter Service, 4159-B East 112th, Cleveland 5, Ohio.

**IF** You Like Motorcycles And Money then send for Harley-Davidson Dealership Book on how to become a franchised dealer of motorcycles and a new line of motor scooters. Here's a chance to own your own business with a very modest investment. The youth market is beginning to explode and the next few years promise a chance to cash in on it. Write for free illustrated Dealership Book Today. Harley-Davidson Motor Company, Dept. P.S., Milwaukee 1, Wisconsin.

**\$3.00 HOUR**—home, sparetime, assembling pump lamps. Easy. Free Details. Ougor, Caldwell, Arkansas.

**FREE** Picture Folder, "How to Make \$3,000. Yearly, Sparetime, Backyard, Raising Earthworms!" Oakhaven-42, Cedar Hill, Texas.

**Free** Sample Of The Secret Key that has made Millions in Mail Order! Free details reveal biggest profit-making Home-Import Mail Order Opportunity ever offered! Mail Order Importers, Dept. B-67, 15201 South Broadway, Los Angeles 61, Calif.



# POPULAR SCIENCE OPPORTUNITIES

**WANTED, Men, Women.** Raise bait for us at home. Full, Spare time. Doesn't take up space. We furnish everything. Sherwood, Dept. D5, Monmouth, Maine.

**LEARN** Appliance service and repair. Motors, washers, refrigeration, cleaners, everything. Free booklet. Appliance, 3570 W. First St., Los Angeles 4.

**FREE Literature** — Make Big Money Raising Fishworms and Crickets. Carter Farm, Plains, Georgia.

**VENDING Machines**—No Selling. Operate A Route of Coin Machines And Earn Amazing Profits. 32-Page Catalog Free. Parkway Machine Corporation, Dept. 18, 715 Ensor Street, Baltimore 2, Maryland.

**COLORGLAZED** Concrete pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries, Grand Rapids, "Minnesota."

**\$100.00 WEEKLY** spare room. Raise redworms soilless way. Odorless. Charlie Morgan, Box 116C, Bushnell, Florida.

**BUY Direct From Factories**—Appliances, Cameras, Watches! Free details! Cam Company, 6810PS-20th Ave., Brooklyn 4, New York.

**IMMEDIATE Profits** with no capital or experience. Take orders for all magazine subscriptions. Friends and neighbors are your prospects. Write now for complete free kit. McGregor Magazine Agency, Dept. 9B, Mount Morris, Illinois.

**BIG Money**—Operate own Fix-it Shop. Service household appliances, motors, mowers, saws, skates, etc. Free Book. Christy Trades School, A-9601, 3214 Lawrence, Chicago 25.

**SELL Merchandise.** Books By Mail! We Supply Everything—Fill Orders—Guide You. Write Fisher Supply, Lime Springs, Iowa.

**PACKAGE At Home For Profit!** We Supply Everything. No selling! ready market. Free details. HPC, 2212 Jesse Street, Los Angeles 23.

**MARKETS Everywhere.** Make Artistic concrete birdbaths, pottery. Best coloring. Home workshop. Hundred varieties. Hollywood Cementcraft, 2527-N Wonderland, Hollywood, 46, California.

**FRANCHISES** make profits! Operate your own independent franchised business as distributor, dealer or agency owner. Nationwide opportunities. National Franchise Reports is the recognized source for information regarding the booming franchise field. Write today for interesting free details of this helpful service. National Franchise Reports, Y-528, 333 North Michigan, Chicago 1.

**\$250.00 WEEK** spare time profit possible. Earn at home with new fascinating Printing method. \$5 starts you—send no money now. Free Confidential Facts and Valuable sample. Screen-Print, JY, Los Angeles 61.

**NEW World of opportunity!** It's yours, when you discover the fastest-growing field for service and products—professional homecare maintenance, led by the world's most responsible franchising system—ServiceMaster. Find out now what investment you need to obtain a ServiceMaster franchise. Find out how all-inclusive it is, how high your first-year income level can be. Today—write ServiceMaster, c/o Marion Wade, Dept. 110, 2117 N. Wayne, Chicago 14, Ill.

**MECHANICAL** aptitude pays big in full or spare time home-import business. Buy low cost imports abroad. Sell friends, stores, mail order. Plan reveals suppliers hundreds foreign bargains like Saws 15c, Electric Razors \$3.40, Spinning Reels 98c. Free Business Details. Mellinger, Dept. C-697, Los Angeles 24.

**MONEY Making** Acme Saw and Lawn-mower Sharpeners. Finest made. Easiest and most profitable to operate. Thousands of satisfied users. Terms. Free literature. Made and guaranteed by Max Manufacturing Company, 138 Stockton Avenue, San Jose 26, California.

**REVOLUTIONARY** storing bins—delicate mechanisms, garages—watchmakers—high commissions—leads. Rotomatic (1510) 152 West 42, New York 36.

**PLATE** Baby Shoes, Jewelry, Gifts, bronze and colored pearl. We finance. Free booklet. Williamson, 11029 South Vermont, Los Angeles 44.

**HOME Mimeographing** jays amazing Profits! Retired operator exposes secrets. Housel, Lanoka Harbor, N. J.

**\$1.00 BRINGS** You \$18.00 Spare-Full Time Home-Business opportunity! Amazing new velvet-spray transforms old cheap lamps, TV-radios, figurines, furniture—anything—into \$\$\$\$ products! Free samples, 50 Business Opportunities Booklet. Send No Money, Flock-Kraft JY, Los Angeles 61.

**MAILORDER** Beginners no cost plan. Armstrong's, 154 Darrington S.W., Washington 24, D.C.

**MANUFACTURER** Fishing Lures, Plastic, none better. 20 Models, Pennies. Free circular. Quaker, 3514-24 N. Lawrence, Phila. 40, Pa.

**IMPORT-Export** Business made easy. Individual setup service. Not just instructions. Hermes, 152 West 42, New York City 36.

**EARN** Good Money sharpening chain saws, scissors, cutters, knives. Free Manual. Treyco, North Tonawanda 1, New York.

**OPPORTUNITY** to earn \$15,000-\$30,000 annually. Franchise protected. Granted on \$12,500 basis. Live at home. No merchandise to buy. Selfemployed. One of most exclusive and noncompetitive Businesses in United States and Canada. Send for free explanatory booklet. Harrell and Company, Box 8-D, Louisville, Illinois.

**MAKE** Figurines, Rubber for Molds. Extra Thick. Free sample. W. Wooley, 2801-B Latrobe, Peoria, Ill.

**RE-Cast** junk batteries into new. Latest achievements. Battery Laboratories, Bayou LaBatre, Alabama.

**MAILORDER** To Churches, Motels, Institutions. Complete individual set-up, not just instructions. Hermes Advertising, 152 West 42, New York City 36.

**NEEDED!** Catalogue Distributors. Easy 10%. Peck's, Box 346, Independence, Kansas.

**OPERATE** Mailorder Dealership! 100% Profit. We Furnish Everything—Fill Your Orders. Particulars Free! Geyer, 456-97 Street, Brooklyn 9, New York.

**PLASTERCRAFT** molds, liquid rubber, plasters, flocks, candle supplies. Catalog and manual free. Jayhawk Plasters, Blue Rapids, Kansas.

**CASH** from Sawdust, Tin-Cans, Newspapers. Over 200 methods. Instructions \$1.00. Charles Company, 42-DPH, Norwood, Ohio.

**MONEY** From Your Mailbox Daily. Free Details. Write Wayne's Service, 3016-2 Channing, N.E., Washington 18, D. C.

**OPERATE** toy rack route. Good profits, small investment Free details. Hav-A-Toy, Box 65, Old Hickory, Tennessee.

**OUTSTANDING** Profit Potentials. \$10 monthly starts you in field gaining widespread acceptance. Free Brochure. Columbia, 45-09-PS Broadway, Long Island City, New York.

**100% PROFIT** selling reconditioned spark plugs. Free Sample. Lee, 1608-K Roberts, Houston 3, Texas.

**PIANO** Tuning learned quickly at home. Tremendous field! Musical knowledge unnecessary. Information free. Empire School of Piano Tuning, Champaign, Illinois. (Founded 1935.)

**PROFITABLE,** enjoyable, low cost mail order business! Lunn, 1523 So. 25 Ave., Omaha 5, Nebr.

**"23 WAYS** To Build a Home Mail Business. With Lifetime Repeat Income!" Amazing Manual Only \$1.00 Postpaid! Satisfaction Guaranteed. Glenn Publications, SP70, Box 507, Jacksonville, North Carolina.

**OVER \$3,000.00 Monthly Net Profit,** mail selling! Proof Free! Torrey, Box 768, Largo 16, Florida.

**\$34.70 TWO** hours. Manufacturing Concrete Products. No Selling. Castings #2, 2907 Dundee, Rapid City, South Dakota.

**\$75.00 WEEKLY** possible mailing catalogs. Roe, 2317M Marshall, Chicago 23, Ill.

**MOTEL-Resort** Management — Qualify for hundreds fascinating, leisurely, well paid executive openings. Learn at home. Free booklet. Motel Managers Training School, PS-3, 612 S. Serrano, Los Angeles 5.

**OPERATE** home Mail-order Business. Vosacek Printing, 4444PS Ute, San Diego 17, Calif.

**LIQUID** Molding Rubber, Free Sample. Shellcraft Supplies, Chaney's, 1907-C East Road, Jacksonville 11, Fla.

**MAKE \$46** From Square Foot Plywood; Jigsaw necessary. Free Details. Woodarts, Bridgewater, Mass.

**YOU** too can make money through Popular Science classified advertising. If you have a product or service which can be sold by mail, write me about it (include literature and samples if possible) and let me help you with an ad which will reach 7 million prospects through these classified advertising columns. Write O. K. Kelly, Classified Adv. Mgr., Dept. 17, Popular Science Monthly, 355 Lexington Avenue, New York 17, N. Y.

**YOUR Own** Mailorder Business! Sell at terrific discount prices. Merchandise postpaid, guaranteed. \$1 starts business. Loden, 928 West Lee, Kingsville, Texas.

## 38 MONEYMAKING OPPORTUNITIES

**DETECTIVES**—Work home—Travel. Experience unnecessary. Detective Particulars free. Write Wagoner, P-125 West 86th, New York 24.

**LEARN** Appliance service and repair. Motors, washers, refrigeration, cleaners, everything. Free booklet. Appliance, 3570 W. First St., Los Angeles 4.

**VENDING** Machines—No Selling. Operate A Route of Coin Machines And Earn Amazing Profits. 32-Page Catalog Free. Parkway Machine Corporation, Dept. 19, 715 Ensor Street, Baltimore 2, Maryland.

**Men - Women!** Start Money-Making Plastic Laminating Business at home in spare time. Material that costs 11c brings back \$2.58. No canvassing or selling but mail orders bring in \$20 a day. Write for full particulars Free. Rush name on postcard to Warner, Room CL-3-H, 1512 Jarvis, Chicago 26, Ill.

**EARN** Extra Money Now. Take orders for all magazine subscriptions. Friends and neighbors are your prospects. For new profits and pleasure, write today for complete, free kit. McGregor Magazine Agency, Dept. 10M, Mount Morris, Illinois.

**NEW** small tag stamping tool: Does the same work as large expensive machines. Small investment gets you started in a business of your own. Maurer Metal Specialties, Box 934, Springfield, Illinois.

**\$3.00 DELIVERS** Stock Market Game. Fascinating family fun. Schmid Game Co., 767 Van Buren, St. Paul 4, Minn. Agents profitable plan.

**EASY** to Earn Extra Money! Free 100 page Catalog. Tandy Leather Company, Box 791, S37, Fort Worth, Texas.

**MAKE** Terrific Money during Spare Time! Take orders with colorfully illustrated catalog of toys, jewelry, all-occasion cards, collector's items and household gadgets. Work your own hours. No experience necessary. Excellent for direct selling or parties. For free money-making catalog, write: North Star, Dept. 6-607, 251 East Fifth Street, St. Paul 1, Minnesota.

**PAINT** Signs using Patterns. Do professional looking job. Starting kit \$5.00. Trial alphabet \$1.00. Harwell, PS-760, Byrdstown, Tennessee.



# POPULAR SCIENCE OPPORTUNITIES

**FREE Literature — Make Big Money** Raising Fishworms and Crickets. Carter Farm-11, Plains, Ga.

**EASY** to start rubber stamp business at home in spare time. Make up to \$9.80 an hour without experience. Facts free. Write to Roberts, 1512 Jarvis, Room CR-3-H, Chicago 26.

**100% PROFIT.** No Investment. Stamp brings Samples, Details. Miller's, Box 584, Brooklyn 1, New York.

**START Big-Pay** business at home in spare time. No experience needed to operate little table-top machine for bronzing baby shoes. Make \$5.46 profit on every pair. Full particulars free. Send postcard to Mason, 1512 Jarvis, Room CM-3-H, Chicago 26, Illinois.

**MAKE Money** Writing Short Paragraphs! No tedious study. I tell you what to write, where and how to sell; and supply list of editors buying from beginners. Many small checks add up quickly. Write to sell right away. Send for free facts. Benson Barrett, Dept. C-86-S, 7464 Clark, Chicago 26.

**TREE-mushroom** pioneers! Spawn, Instructions, \$1.00. Ohga, PS190, Sigakenkusu, Japan.

**DYNAMIC Mail Order Plans.** Everything furnished. Information 25c. Donovan, 79-PS Greenbelt, Levittown, New York.

**MINK** Raising information free. Complete. Lake Superior Mink Farm, Superior EE, Wisconsin.

**AMAZING** successes through franchises! Become exclusive franchise holder your territory. Information rushed. National Franchise Reports, SP-528, 333 North Michigan, Chicago 1.

**FREE Gifts.** Catalog \$1. Loden, 928 West Lee, Kingsville, Texas.

**MAKE Over \$6.00** per hour with small table saw. No experience necessary. Evans Enterprise, Box 12496-S, St. Petersburg 33, Florida.

**MONEY** at home raising bait for us. Downeast, PS-3, Box 149, Bangor, Maine.

**MAKE Money** Clipping Newspapers. For information, write, Newscraft, PS-983-E, Main, Columbus 5, Ohio.

**EXTRA Cash Unlimited.** Information \$1.00. Sure-way, Rt. 1, Box 171, Dos Palos, Calif.

**EARN big money.** Learn shorthand. Amazingly easy. Only \$2.98. Details Free. Steele, 7569-j University, La Mesa, California.

**EARN big profits** selling cord wood to homeowners. Lickity Engine Driven Log Splitter will put you in business. Waco Aircraft, Troy 5, Ohio.

**GOOD income** from home typing—17 proven ways. Detailed information \$1. (refundable). Ryco, 210-B Fifth Ave., New York 10.

**OUTSTANDING** Investment Potentials. \$10 monthly starts you in field gaining widespread acceptance. Free Brochure. Columbia, 45-09-S Broadway, Long Island City, New York.

**\$1,000—\$10,000. YEARLY** Possible, raising Fish Worms! Full, sparetime; backyard, garage, basement, spare room. Sell your crop to us! Send name to: Red Wiggles, Warsaw 3, Indiana.

**WANTED:** Permanent men to make \$4.00 or more per hour assembling our TV "Snakrak" (Trademark) at home. Information \$1.00 to eliminate curiosity-seekers. Stobal, Box 407, Birmingham, Ala.

**GET Listed** for life! Receive hundreds free magazines, samples, special offers. Rush 25c, stamped, addressed envelope. Columbia, 45-09-SN Broadway, Long Island City, New York.

**BOSS your own home business.** Profits 1200% to 3000%—Make, distribute stunning Shellcraft jewelry. Sells itself wherever displayed. Big repeat demand! Details free! Shellcraft, Dept. E, Box 804, Panama City, Florida.

**CIGARETTES—Make 20** plain or filter-tips for 9c. Facts free. Moberly, Box 911, Owensboro, Kentucky.

**SELL Aluminum Siding, Awnings** Wholesale! Write Groff, Box 10446, Tampa, Florida.

**TRICK cards** set \$1.00 with free instructions. Cards Co., (Dept. S4), 9655-107 A Ave., Edmonton, Alta.

**\$200.00 MONTHLY.** Spare Time. With Tablesaw. Write. Holiday House, 7222 4th Plain, Vancouver, Washington.

**BIG Profits** in pest control, full time—part time. Free details. Baylab, Box 21, Cambridge, Maryland.

**MONEYMAKING** At Home. Information \$1. Loden, 928 West Lee, Kingsville, Texas.

**BIG Profits** can be yours through these classified advertising columns. If you have a product or service which can be sold by mail, write me about it (include literature and samples if possible), and let me help you with an ad which will reach seven million prospects through this magazine. Write today to O. K. Kelly, Classified Advertising Mgr., Dept. 7, Popular Science Monthly, 355 Lexington Avenue, New York 17, N. Y.

## 38A BUY IT WHOLESALE

**LARGEST Wholesale Supply Source** in U.S. Get free catalogs. Furniture, clothing, appliances, autos and accessories, farm equipment, tools, housewares, hobby supplies. Free details. Associated Wholesalers, Box 2068-C, Sioux City 4, Iowa.

**NEW Deluxe** wholesale Catalog, automobile catalog, and others. Housewares, appliances, refrigerators, freezers, washers, dryers, television, radios, furniture, clothing, luggage, binoculars, phonographs, recorders, cameras, projectors, typewriters, power tools, toys, sporting goods, watches, jewelry. Name brands. Huge discounts. Postcard (any card): Selbyco, Decatur 170, Illinois.

**GOLF Clubs Wholesale.** Free Price List. Crystal Golf Sales, Crystal, Mich.

**BUY Merchandise** at Big Discounts. Catalog 25c, refundable. Specialties, Box 1382, Joliet, Illinois.

**100,000 PRODUCTS Wholesale!** Terrific Bargains! United Wholesalers, 1265 Broadway, New York 1, N. Y.

**2,000 PAGES Wholesale Catalogs.** Write. Mosaser, Box 47-A, Newark, Ohio.

**WHOLESALE!** World's Largest Supply. Buy from 679 American, European, Japanese wholesalers. Tailormade suits from Hong Kong. Free details. International Buyers, 216-S Jackson, Chicago 6, Ill.

**ELECTRIC Guitars, amplifiers,** wholesale. Free Catalog. Carvin, PSW, Covina, California.

**FREE Power Tool Catalog.** Roberson, 14R Brooks Drive, Austell, Georgia.

**PRINTING, Office Supplies** Typewriters. Tremendous money-making opportunity. Tymula, Westover, Stamford, Conn.

**MEN: Sell Rebuilt Nickel Plated Spark Plugs.** Small Investment. Rocket Plugs, 5415 York Blvd., Los Angeles 42, Calif.

**VACUUM Cleaner Disposal Paper Bags** To Fit Any Make. \$1.00 Pk. Postpaid. Fast Delivery. Send Make And Model. Olson Co., P. O. Box 493, Norwalk, Conn.

**BELOW Wholesale** most merchandise. Write Factory Buyers, 446 Jacksonville, Illinois.

## 38B IMPORT-EXPORT

**WHOLESALE Import Catalogs!** Circulars! 5 different: Japanese transistor radios; German tape recorders; cuckoo clocks; Swiss watches; domestic Name Brands. Other offers. Complete \$1.00 (Refundable). Mashburn's Importico, Box 202, Asheville, N. C.

**WORLD Directory.** 200 contacts. Automobiles, zippers. Everything. List \$1.00. Details free. Olson Company, Box 493J, Norwalk, Conn.

**100 ADDRESSES** of Foreign exporters \$2.00. B. Twyford, 343 Harding Court, Pitman, N. J.

## 39 FORMULAS, PLANS, ETC.

**FORMULAS—All Kinds—Moneymakers.** Three catalogs, Dime. Kemico, Park Ridge 15, Illinois.

**LATEST Formula Developments;** Doctor Science. Products Analyzed. Johnson Laboratory, Delaware Ave., R.D., Delmar, New York.

**LATE Modern Manufacturing Formulas** List Free. Chemical Service, Martville, New York.

**LARGE Formula Catalog** Free Big Surprise. Western Chemical, Salem, Oregon.

**SPECIAL Formulas** for latest money-making discoveries. New! Good! Profitable! Valuable Literature Free! Miller, Chemist, 1517-N, Tampa, Florida.

## 40 PLASTICS

**LAMINATING Supplies** Price List free. Solomson, 4 Beacham, Everett 49, Mass.

**CELLULOID scrap.** Sheets, state thickness, colors. Box 333, Kearney, New Jersey.

**PLEXIGLAS — Any thickness — Clear**—Colors—Cut to size—Clear Rods—Tubing. McClarin Plastics, P.O. Box 168B, Hanover, Pennsylvania.

**ELECTRIC Plastic Laminating Kit.** Hobby. Easy. Profitable. Details. Burr, 330 East Centre, Kalamazoo, Michigan.

**PLASTICS** and accessories for casting, molding, modeling. Send 25c for 64 page catalog. Castacraft Corp., Box 555, Palo Alto, California.

**FREE Sample plastic vacuum molding.** 3 sizes of machines. Utilize ordinary vacuum cleaner. \$40 up. Make 3D signs, pictures, displays, skin pacs. 2000 in use. Free Sample, literature. RAB Industries, 6363 Wilshire, Los Angeles 48, Calif.

**PLASTIC Embedding** for fun and profit, no oven. Make beautiful jewelry, decorative panels, science specimen castings. Catalog 25c. Natcol Plastics, Box 444, Yucaipa 4, California.

**NEW Liquid casting plastic,** clear, colors. Embed real flowers, butterflies, photos, coins. Send 25c for two handbooks "How to Cast Liquid Plastics" and "How to Make Extra Money at Home." Castolite, Dept. H-102, Woodstock, Illinois.

## 41 SCIENCE & CHEMISTRY

**AMAZING New Book Of Science Experiments,** formulas, and Catalogue of Laboratory Supplies. Only 35c. National Scientific Co., Dept. PS-7, 13 S. Park Avenue, Lombard, Illinois.

**FREE Chemical Elements Chart.** Send self-addressed, stamped envelope. 315 South Lancaster, Mass.

**MINIATURE Recording Instruments.** Portable or fixed. Temperature, pressures. Instrument Service Company, 39 Woodland, Sharon, Massachusetts.

**CHEMICALS** in small quantities—glassware, apparatus. Set re-fills. Illustrated catalogue 25c. Bio Chemical Products, 30P Somerset, Belmont 78, Massachusetts.

**ILLUSTRATED Catalog;** Chemistry, mineralogy, biology 25c. Tracey Laboratories, Evanston, Illinois.

**CHEMICALS** and apparatus for industrial, analytical and private laboratories. Catalog 25c. Dept. M-26, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N. Y.

**232 PAGE Catalog** \$2.00. Laboratory Materials, 7319 Vincennes, Chicago, Illinois.

**BOOKLET, "Scientific Oddities,"** free copy. Franks, 3121 South Racine, Chicago 8.

**CHEMISTRY—Microscopic—Insect:** Butterflies—Rocks: Minerals—Sets Complete. Literature—Amateur Chemist and Microbiologist, 208 East Eleventh, Kansas City, Mo.



# POPULAR SCIENCE OPPORTUNITIES

**UNUSUAL** Chemistry books, courses, kits! Rare chemicals, cheap! Catalog 25c. National, Box 133-A, Palo Alto, Calif.

**EXPERIMENTERS:** New! Bigger Catalog and "Experiments Booklet". Only—25c. Hagenow Laboratories, Manitowoc, Wisconsin.

**ECONOMICALLY** Priced! Laboratory Materials Catalog 20c. Starr Scientific, Manitowoc, Wisconsin.

## 42 HELP WANTED REPORTS

**FREE** Information — USA Overseas Jobs, High Pay, Transportation—Futures, Dept. P, 215 West 34th Street, New York City 1.

**JOBS:** High pay, Foreign countries, USA. All trades. Write Dept. 55E, National Employment Information, 1020 Broad, Newark, N. J.

**JOBS** on Steamships and Yachts, traveling foreign countries. Davenport's, 1354-J, GPO, New York 1, New York.

**FOREIGN** Jobs—Latin America, Alaska, Canada, up to \$1500 monthly. Up-to-date 1960 Foreign Service Directory gives complete information; hot list of firms hiring for Military and Civilian Construction, Aircraft, Oil, Exporters-Importers, Mining, How-When-Where to apply. 12th Successful year, \$1.00. Global Reports, Box 8873-P, Los Angeles 8, California.

**HIGH** Pay Overseas, Domestic Jobs. Men, Women. Generous Benefits. Companies Pay Transportation. For info; write: World Wide, Dept. C1, 149 N. Franklin St., Hempstead, N. Y.

**AMERICAN**—Overseas Jobs, Higher Pay, Transportation — Benefits. Men-Women. All Occupations. Details—Write: Employment Headquarters, 79 Wall Street, Dept. D-10, New York 5.

**JOBS**, Ships, \$100 Weekly Beginners Travel, Adventure, Details Free. Seaman's Service, Box 17-P, Brooklyn 8, N. Y.

**GET** into the beauty business. Women love he-men hairdressers. Earn \$200. + tips weekly. Jobs open on cruise ships, overseas. For confidential facts send \$2.00. Phillips Career Research, P. O. Box 1743, Wheaton, Md.

## 43 AGENTS WANTED

**100% PROFIT** selling amazing new gum pen! A ball point pen that dispenses dots of quick sticking rubber cement. Sample and details \$1.00 postpaid. W. Treanor, 1113 Walnut St., San Gabriel 18, Calif.

**BUSINESS** of your own. Earning potential as high as \$40,000 annually. Issued on \$12,500 base. No merchandise to buy. Send for free explanatory booklet. Harrell & Company, Box 8-DD, Louisville, Ill.

**MEXICAN** art goods! Free Sample! Send 14c stamps mailing. Sylval, Apartado 9036, Mexico City.

**DON'T** miss our ad under "High-Grade Salesmen" in this magazine. National Press.

**YOUR** Own business—Suits \$1.50; Overcoats 65c; Mackinaws 35c; Shoes 12½c; Ladies' Coats 30c; Dresses 15c. Enormous profits. Catalog Free. National Mail Order, 2111-J Roosevelt Road, Chicago 8, Ill.

**EVERY** Man A Prospect. Request refundable sales kit offer showing line of belt buckles, tie clasps, money clips, cuff links, lapels, individualized with customer's name and emblems. Cap badges for trucking, bus, taxi, police, firemen, also heavy construction emblems. Choice 3000 emblems. Hookfast, Box 1425PS, Providence, R. I.

**START** Your Own Business On Credit (U.S. and Canada). Your own boss. 1396 Dealers sold \$5,000 to \$25,000 in 1959. We supply stocks, equipment on credit. 200 home necessities. Sales experience unnecessary. Pleasant profitable business backed by world-wide industry. Write Rawleigh's, Dept. G-U-PSC, Freeport, Ill.

**SWISS** Watches, popular priced. Direct from importer. Agents wanted. Transworld, 565 Fifth Ave., N. Y.

**TRUCKS & Boats** need Vinyl Signs—Good Commission. Gordon's Diversified Distributors Co., Dept. PS-2902, 6915-17 Michigan Ave., Detroit 10, Michigan.

**BEAUTIFUL** Feather Pictures! Free Details. Sample 20c Stamps. Apartado 1668, Mexico 1, D. F.

**MAKE** \$1,000 Extra This Year! Over 800 best-selling items! Gifts for men, women, children, the home! Distinctive greeting cards, stationery, jewelry, cosmetics, mechanical gadgets, novelties, household helps, toys, games. No minimum order. Samples on approval. Make up to 92% profit! Write for free catalog. Greetings Unlimited, 6-209 Park Square, St. Paul 1, Minn.

**MALE** Female. Age no barrier. Supplement income taking magazine subscriptions. Work from home. No overhead. A & B Magazine Service, 1442 N. High St., Columbus 1, Ohio.

**WILL** you wear new suits and topcoats without one penny cost and agree to show them to friends? You can make up to \$30.00 in a day even in spare time, without canvassing. Progress Tailoring Co., 500 South Throop St., Dept. H-326, Chicago 7, Illinois.

**60% PROFIT** Cosmetics \$25 day up. Hire others. Samples, details. Studio Girl-Hollywood, Glendale, Calif., Dept. 1107H.

**NAMEPLATES**, Desk signs, for homes, business. Whitney Nameplates, West Springfield, Mass.

**MONEY-Making** Opportunity! Take big profit orders for world famous Patented Varieties Fruit Trees. Also Flowering Shrubs, Roses, Vines. Big Sales outfit Free. Stark Bro's, Desk 30171, Louisiana, Missouri.

**UP** to \$300 Extra Money. Show friends fabulous self-selling Evans Christmas Card. Gift line. Profits to 100%. Send no money—write for sample boxes to be paid for or returned, plus big Free Album Personalized Cards. 2 Catalogs 300 items. New England Art Publishers, North Abington 739-C, Mass.

**NEW** Bathroom Deodorizer. Hangs on wall. Banishes odors bathroom, kitchen. Lightning seller. Samples sent on trial. Kristee 73, Akron, Ohio.

**AMAZING** Christmas Card Profits! Make 75c, not 50c, on fast-selling \$1.25 Assortment; \$75.00 on 100. Gift Bonuses. Complete line: assortments, novelties, \$1.00 up. 3 Personalized samples Free; assortments on approval. Free Gift Offer. Creative, 4401 Cermak, Dept. 508-P, Chicago 23.

**TERRIFIC** Profits with outstanding line of Nationally advertised Plastic Housewares, Dishes, Draperies, Garmentbags, Tablecloths, Rainwear, Utility covers. Free catalog PS-67, Acclaim, Box 4, New York 40, N. Y.

**MAKE** Profitable Men's-Women's wear. Sample Free. Sunmade, Brockton 64, Massachusetts.

**BIG** Profits—Stamp Social Security Plates Key Protectors. Sample—50c. Catalog Free. General Products, 11 No. Pearl St., Albany 7, N. Y.

## 44 HIGH-GRADE SALESMEN

**YOUR** free copy of World's biggest sales magazine tells you how and where to make more money on your own in selling. Write Specialty Salesman Magazine, Desk 6B, 307 North Michigan, Chicago 1.

**MAKE** Extra Money—Big Cash Commissions plus premiums for you and your customers. Sell Advertising Book Matches—sensational new Tenorano, Glamour Girls, Hillbillies; dozens others. All sizes—Quick daily sales; big repeat business. Free Master Kit makes selling easy—no experience necessary. Superior Match, Dept. P-760, 7530 Greenwood, Chicago 19, Ill.

**IF** you're interested in making money in selling, see the hundreds of exceptional opportunities in Salesman's Opportunity Magazine. Send name for your copy, absolutely free. Tell us what you're selling now. Opportunity, 848 N. Dearborn, Dept. 18, Chicago 10, Illinois.

**MAKE** Extra Money Selling advertising matchbooks. Free catalog and sales outfit. Matchcorp, Dept. PS-70, Chicago 32.

**EARN** Big Commission Full Or Part Time. Build profitable business of your own selling America's largest line low priced business printing. 360 page catalog, samples, hundreds of items used daily by business people. Imprinted ball pens low as \$6.95 for 100. Calendars low as \$5.95 for 100. Free sales kit. National Press, Dept. 9, North Chicago, Illinois.

**BUSINESS** Kit Free! Postcard puts you in business! Complete line 230 shoe styles, also jackets! New discoveries pay Big Commissions. No investment. Send for Free Kit. Mason, Chippewa Falls K-322, Wisconsin.

**MAKE** Up To \$147.50 Daily with simple 30-second demonstration sensational new Voicecaster. Frees both hands, permits work while phoning, hold 2-way phone talk anywhere in room. Transistorized, no installation. Offices, stores, factories order 1 to 6; housewives order fast. Make \$14.75 and more each. Ten sales daily possible spare or full time. Money-making plans Free. Write Voicecaster Div., Merlite, 114 E. 32nd St., Dept. A-66R, New York 16.

**SHINE** Shoes Without "Polish". New invention. Lightning seller. Shoes gleam like mirror. Samples sent on trial. Kristee 40, Akron, Ohio.

**MAKE** \$100 weekly part time selling dealers. Berkshan, Elkhorn 8, Wisc.

## 45 EDUCATIONAL & INSTRUCTION

**LEARN** While Asleep with your recorder, phonograph or amazing new "Electronic Educator" endless tape recorded. Details free. Research Association, Box 24-NN, Olympia, Washington.

**HIGH** School Diploma at home. Licensed teachers. Approved materials. Southern States Academy, Station E-12, Atlanta, Ga.

**USED** Correspondence Courses and Books sold and rented. Money back guarantee. Catalog free. (Courses Bought.) Lee Mountain, Pisgah, Alabama.

**MASTER** Watchmaking at home. Free sample lesson. Chicago School, 2328-WG Milwaukee, Chicago 47.

**WANT** a Diesel Job? Higher Pay? Advancement? We can help you qualify! Complete Diesel, Tractor and Heavy Equipment and Cummins Diesel Engine Shop-method home-training courses available. Write today. Interstate Training Service, Dept. B-2, Portland 12, Ore.

**EARN** While You Learn Auto and Diesel Mechanics. Master this top paying trade. Many graduates earn \$100 a week and up. Approved for Korean veterans. For free information write Dept. No. 262, Nashville Auto-Diesel College, Nashville 3, Tenn.

**LEARN** Appliance service and repair. Motors, washers, refrigeration, cleaners, everything. Free booklet. Appliance, 3570 W. First St., Los Angeles 4.

**COMPLETE** Your High School at home in spare time with 63-year-old school. Texts furnished. No classes. Diploma. Information booklet free. American School, Dept. XB46, Drexel at 58th, Chicago 37, Illinois.

**LEARN** Civil and criminal investigation at home. Earn steady, good pay. Institute Applied Science, 1930 Sunnyside, Dept. 33B, Chicago 40, Illinois.

**GOOD** paying jobs open! Operate, repair heavy earth moving equipment! Learn "on the job" operating latest cranes, bulldozers, earth carriers! V.A. Approved. Free Catalog. Write N.G. Hutch, Greer Technical Institute, Braidwood, Illinois.



red/g

2015

**This One**



**87R5-D8W-FRN7**



**BOOKKEEPERS**—Operate Your Own "Dollar-A-Week" System. Ellis, Box 200, Cedar Grove, North Carolina.

**DEVELOP** Your voice—for more success in business, social life! Free booklet. (Give age.) PV Institute, 210 South Clinton, Studio EP-1, Chicago 6.

**ACHIEVE** a Dynamic Personality with our proven Individual Sleep records; Three subjects Dynamic Personality, Self-Assurance, Self-Control for only \$4.98 postpaid. Satisfaction Guaranteed. Keane Records, 1439B No. Western Ave., Hollywood 28, Calif.

**FREE** General Catalog—100 Pages Text vocational, educational, instructional subjects. Millions of volumes, new and used. Bargain prices. Books bought. Est. 1902. Long's College Book Co., Dept. PS, Columbus 1, Ohio.

**LEARN** Auctioneering. Free catalog. Missouri Auction School, Box 9252X5, Kansas City, Missouri.

**ENGINEERING** and Art Degrees earned through home study. Electronics, Electrical, Mechanical, Civil, Physics, Business Administration, Accounting, Liberal Arts. When writing, specify course desired. Pacific International College of Arts & Sciences, primarily a correspondence school. Resident classes also carried. 5719-A Santa Monica Boulevard, Hollywood 38, California.

**LEARN** Sketch-Easy Industrial Drawing—amazing short-cut method used by U.S. Armed Services and space-age industries. Get a better job, advance faster, make more money. Not a long-drawn-out drafting course. Only few hours home study qualifies you. Free details. Science Laboratories, Dept. PS-6, 250 S. Prairie, Hawthorne, California.

**HIGH** School at home. No classes. Texts furnished. Diploma awarded. If 17 or over and left school write for Free assignment and catalog. Wayne School of LaSalle Extension University. A Correspondence Institution. Dept. 758 WC, 419 S. Dearborn, Chicago 5, Ill.

**BE A** Real Estate Broker, Insure Security for yourself and your family. Study at home. Prepare for state examination. GI approved. Write for Free Book Today. Weaver School of Real Estate, 2018R Grand, Kansas City, Missouri.

**INFORMATION!** College scholarships, financial aids, and loans. Estimated expenses at major colleges included. Send \$2.00. Richard's Brochures, Box 2223, Saviers Station, Oxnard, Calif.

**MEN**, 17 to 45. Train Now as Heavy Equipment Operators. Enormous nationwide highway and building program has careers for thousands of men. No interference with present job. Full, practical training with latest machines following completion of preparatory instructions. Information Free. No obligation, write to Heavy Equipment Training, Universal Schools, Dept. U-9, 11 E. 47th St., New York 17, N. Y.

**PIANO** Tuning learned quickly at home. American School of Tuning, Box 707, Gilroy, California.

**ANALYZE** Handwriting for profit, pleasure. Free sample lesson, catalog reveals plan. Write Igas, Inc., Dept. 1, Springfield 4, Missouri.

**EARN** Diploma through correspondence courses—Hypnology, Psychology. Join Hypnotists' Association. Aured, Central Valley, New York.

**USED** Correspondence Course, Books. Satisfaction Guaranteed. Catalog 10c Refundable. Courses Bought. Bayles, 78-D Courtright, Wilkes-Barre, Penna.

**LEARN** To Dance! Beginner's Basic Information, 36 Steps, 35c Postpaid. R. A. Hancock, 1811 Piedmont, San Antonio 10, Texas.

**BECOME** Tax Consultant. Graduates earn \$1,000-\$3,000 every tax season preparing returns evenings. State approved. Union Institute, Lakewood 1N, N. J.

**HOME** study courses. Free details. Technical Training Service, 146SE, Brooklyn 14, New York.

**COMPLETE** Piano Course. \$3.75. Free Brochure. Palmer Sales, P. O. Box 93, Lowellville, Ohio.

## 46 CONTESTS

"HOW To Win Prize Contests" \$1.00. R. Plumb, Herkimer, N. Y.

**PUZZLE** fiends! Our magazine helps win prizes. Sample, 25¢. Spence, Box 11569, St. Petersburg, Fla.

## 47 DETECTIVES

**DETECTIVES**—Work home—Travel. Experience unnecessary. Detective Particulars free. Write Wagoner, P-125 West 86th, New York 24.

**DETECTIVE** Profession. Home Study. Badge, Certificate, Future. Box 41197-G, Los Angeles 41, California.

**DETECTIVE** Training. Phillips Secret Service System, 1917-C North Kenneth, Chicago 39, Ill.

## 48 LANGUAGE OUTFITS

**LEARN** world interlanguage endorsed by Unesco. Free lesson. Esperanto. Middleton, Wisconsin.

## 50 BUSINESS SERVICE, INFORMATION, NAME LISTS

**LIVE** Names Available—Buyers, Prospects! (200,000 Mailorder Book; 15,000 Earthworm). D. Dickman Company, Willow Springs, Missouri.

**LISTS.** Duplicate Mail Lists Yourself Fast And Cheap. Information \$1.00. Duncan, P. O. Box 152, Times Square, N. Y. 36.

## 51 SPECIAL SERVICES

**EXPERT** evaluates house plan you have chosen/designed. Critique submitted. Fee \$15. Joseph Polek, 556 Leverington Ave., Philadelphia 28, Pa.

## 52 AUTHORS SERVICE

**WANT** Your Book Published? Learn how we publish, advertise, promote, distribute. Many successes. Free booklet PS. Vantage, 120 West 31, New York.

**SONGWRITERS'** Songs Published and Recorded. Free Music. Free Lyric Course. Amateur Songwriters, 1075 Boylston Street, Boston, Mass.

## 53 ADVERTISING AGENCIES, ETC., FOR ADVERTISERS

**SAVE!** Circulars, brochures, folders, etc. Designed and printed. Samples. Flair, 8 West 45th, New York City 19.

**ADVERTISING** by industrial writer of forty years experience. Moderate fees. VanDenburgh, Box 201, Newark 1, N. J.

**FREE!** Red-hot book, "More Profit From Your Advertising." Lists best Mail Order Magazines, Newspapers. Adservice, 516A Cornelia, Chicago 13.

**SOMETHING** to sell? Write us about it and let us help you with a classified ad which will reach 7 million potential customers in the classified Opportunities section of this magazine. Include literature or samples if possible. Write today to O.K. Kelly, Classified Adv. Mgr., Dept. 700, Popular Science Monthly, 355 Lexington Ave., New York 17, N. Y.

## 54 CARTOONING, SIGN PAINTING, CHALK TALKS

"HOW to Make Money With Simple Cartoons"—A book everyone who likes to draw should have. It is free; no obligation. Simply address Cartoonists' Exchange, Dept. 197 Pleasant Hill, Ohio.

**CARTOONING** for Profit! Learn at home, experience unnecessary. Famous system of Manual Training brings amazing results. Free book, write Continental Schools, Dept. B-71, 420 S. Broadway, Los Angeles 37, Calif.

**COMMERCIAL** Art Training. A home study course of separate lessons at student rates. For age 14 and up, free information at—Filson Art Plates, Box 500m, Helena, Montana.

## 55 TYPEWRITERS & OFFICE MACHINES

**TYPEWRITERS** \$22.50 up. Portables, Standards. Meier, 118 Spruce, Wichita, Kansas.

## 56 RUBBER STAMPS & OFFICE SUPPLIES

**FREE**—Rubber Stamp Catalog. Martins, 1425 Major Drive, Jefferson City, Missouri.

**BARGAIN** Rubber Stamps! Literature free. A. Johnson, 400 North Cicero, Chicago 44.

**INDEXED,** Cushioned, 3 lines \$1.00, 4 or 5 lines \$1.50 (Script, Print, Old English). All Size Stamp Pads. Free stock stamp literature. One day service. Youngers Stamp Shop, Princeton, Iowa.

**THREE** line, self-inking pocket rubber stamp; plastic case \$1, metal case \$1.80. L. Watson, P. O. Box 162, St. Charles, Illinois.

## 57 PRINTING, MULTIGRAPHING, ETC.

**FREE** Catalogs. Postpaid printing, Rubber stamps. D M Press, Sebastopol, Calif.

**OFFSET** Printing—24 Hour Service—\$6.75—1000 8½x11, \$18.50—5000. National Letter, 300 West 43rd St., New York City 36.

**1,000 BUSINESS** Cards, "Raised Letters" \$3.95. Samples. Pioneer, PS-7, Island Park, New York.

**100 6¼** Envelopes, 100 5½x8½ Letterheads printed, \$2.35. M. Fortney, R3, Dillsburg, Pa.

**COLORED** or white 8½x11 offset, \$6.50—1000; \$18—5000. Fast! Flair, 8 West 45th, New York City 19.

**1,000 BUSINESS** Cards "Raised Letters" \$3.75. Agents Wanted. Elco, 5909 Highlandview, Sylvania, Ohio.

**QUALITY** Printing, 100 8½x11 letterheads and 100 6¼ envelopes, \$2.00 postpaid. Roycraft Press, 2263 Sibley Road, Augusta, Georgia.

**BUSINESS CARDS,** letterheads, envelopes, Advertising Post cards, labels, rubber stamps, statements, offset printing. Free samples and catalog. Youngers Printing, Princeton, Iowa.

**BUSINESS** Cards, 1000—\$2.95. Rubber Stamps. Other printing prices lowest. Weiss, P. O. Box 8304, Kansas City, Missouri.

**LETTERHEADS,** Circulars, etc. Price list. Valaitis, 1705 South 2nd, Phila. 10, Pa.

**1000 GUMMED** Name & Address Labels \$1.00. Perk's, Essex, Mass.

**SUPER** Offset — 8½x11 — \$4.85 — 1000. Business Cards Raised — \$3.25 — 1000. Graphic, 780 Main, Hackensack, New Jersey.

**500 ¾x2¼** Four Line Stickers \$1.00. Red Border \$1.50. Moritz, 312 Tuscola, Saginaw, Mich.

**PRINTED** colorful joke cards set \$1.00. Cards Co., (Dept. S5), 9655-107 A Ave., Edmonton, Alta.

**1000 BUSINESS** Cards \$3.49. L-D, 318 West 25th, Cheyenne, Wyoming.

**RAISED** Letter Business Cards like engraved, \$3.00 thousand. Kavanagh, 607-PS Knickerbocker Ave., Brooklyn 21, N. Y.

**1,000 BUSINESS** Cards, "Raised Letters", \$3.95. Scull's Printing, Wildwood, New Jersey.

## 58 PRINTING OUTFITS, SUPPLIES

**PRINTING** Outfits, type, supplies. Send dime for illustrated supply book and samples. Kelsey, Inc., H-8, Meriden, Conn.



# POPULAR SCIENCE OPPORTUNITIES

**PRINTING** Presses, Type, Supplies, Lists, 4c. Turnbaugh Service, Mechanicsburg, Pa.

**RUBBER** Stamp Presses, Hydraulic Operated. Electrically heated. Sizes 5"x8", 8"x12", 10"x15", starting outfits, supplies. Printing Presses, Custom Manufacturing, 507 N. Jefferson, Springfield 2, Missouri.

**MAKE** Your Own self-molding rubber stamps and printing cuts. Plexirubber, Argyle 2, Wisconsin.

**TYPE** cases, cabinets. Manufacturer. Catalog. King McKay Company, 23179 Telegraph, Southfield, Michigan.

**RUBBER** Stamp Presses, Supplies. Kiewiet, 2025 Barney Road, Kalamazoo, Michigan.

## 60 FOR INVENTORS

**WE** have the markets if you have the ideas. Harvey Engineering, Cambridge 1, Maryland.

**INVENTORS**—Get The Best Offer First! Patented or unpatented. Write Carl Sommer, Director, Industrial Invention Sales, 3136-B Sylvania Ave., Toledo 13, Ohio.

**INVENTORS!** Why be broke? Turn your invention into cash. If saleable, we can sell it. Write Universal Inventions, Box 298, Marion, Ohio.

**INVENTORS**, if you have an invention for sale, patented or unpatented, write Institute of American Inventors, Dept. 30A, 635-F St., N.W., Washington 4, D. C.

**INVENTIONS** needed immediately for manufacturers. For additional information write Kessler Corporation, C-76-FI, Fremont, Ohio.

**SELL** your invention! Profitability Reports, (PS-70), 145 West 45th, New York 36.

**"CASH IN"** your invention. Avoid mistakes. What you should know and do about protection. Send 25c coin for "The Inventor's Guide". Satisfaction guaranteed. Inventors Guidance Service, Box 451B, Calimesa, California.

**PATENT** Drawings Prepared. Dolmar, 4837 Wisconsin Avenue N.W., Washington 16, D. C.

**PATENTS** Skillfully Prepared for maximum commercial value with useful product development. High record of success in proving and claiming patentability. Valuable market service. Patents prepared and filed for service fee as low as \$200.00. Send for self protecting invention record forms free. Patent search with valuable engineering report \$15.00. Thirty Years established. Joseph O'Brien, Patent & Development Engineer, 132 Nassau Street, New York 38, N. Y.

**INVENTORS' Complete Service.** Cash-Royalties Sales. Inventions Researched. Patent Development Engineering. Free Invention Certificate. George Spector, Licensed Invention Engineer, 3615 Woolworth Building, New York.

**PATENT** Searches, including complete copies of related patents, \$6.00. Inventors, attorneys, manufacturers use my original "World-Wide" Airmail service. "Proof of Invention" protection form and "Information Every Inventor Needs" sent free! Miss Jane Hayward, 1029 Vermont Avenue N.W., Washington 5, D. C.

**SAVE!** New Inventor's Patent Kit makes it easy to apply for patents yourself. Free "Registration Form." Miss Suzanne Blaine, 1850 General Post Building, New York 1, New York.

**QUALITY** Patent Searches, \$6.00. Copies of closest patents forwarded. Free "Protection Certificate." American Patent Search Co., 422 Washington Bldg., Washington 5, D. C.

**INVENTORS!** Our Patent Search Department administers searches expertly. \$6.00. For dependable service, free invention protection forms write United States Invention Brokerage, 78s Wall Street, New York 5, N. Y.

**INVENTORS!** Determine patentability of your invention. Searches of the Patent Office Records administered professionally—\$6.00. For free invention protection forms, dependable service write Washington Patent Office Search Bureau, 1426 G Street, N.W., Washington 5, D. C.

**INVENTIONS** wanted now by my Manufacturer Clients. Patented. Unpatented. Write Gilbert Adams, Patent Broker, 80 Wall Street, Financial District, New York City.

**PATENT** Searches including copies of nearest patents, \$6.00. Reports airmailed within 48 hours. More than 200 registered patent attorneys have used my service. For Free invention protection forms. Write Miss Ann Hastings, P. O. Box 176, Washington 4, D. C.

**PATENT** Searches \$6.00. 48-hour airmail service. Invention Protection forms free. Write Patent Engineering Service, 711 14th Street N.W., Washington 5, D. C.

**PATENT** Searches \$6.00. 48-hour service. Formerly with U.S. Patent Office. Free Invention Protection forms. Write Raymond L. Smith, Patent Searcher, 620 Sheraton Building, Washington 5, D. C.

**DON'T** pay high fees! Obtain U. S. Patent yourself. It's easy with "Professional Kit with Fill-In Forms." Free "Registration Form." Patent Protection Institute, 2000 P Street, N.W., Washington 5, D. C.

**PROFESSIONAL** searches of the Patent Office records. Dependable. Reliable. \$6.00. For free protection forms write Inventions on Demand, 412 Albee Building, Washington 5, D. C.

## 60A ENGINEERING SERVICES

**IDEAS** Developed, designed and made practical by professional graduate engineers. Complete protection. Successful Clients. Literature sent free. Consulting, 5857 Boy Scout Road, Indianapolis 26, Indiana.

**INVENTION** Development. Drawings. Save time, money. Details free. Todd Consulting Engineers, 424 West 119th, New York 27.

## 61 INVENTIONS WANTED

**INVENTORS:** Hundreds of manufacturers have requested our assistance in locating marketable new products. Complete information free. Institute of American Inventors, Dept. 30C, 635-F Street, N. W., Washington 4, D. C.

**INVENTIONS** wanted. Patented; unpatented. Tremendous Manufacturers lists. Global Marketing Service, 2420 77th, Oakland 5, Calif.

**ARE** you interested in offers from reliable manufacturers for your invention? Patented, unpatented. Harvey Engineering, Cambridge, Maryland.

**INVENTORS**—Get The Best Offer First! Patented or unpatented. Write Carl Sommer, Director, Industrial Invention Sales, 3136-B Sylvania Ave., Toledo 13, Ohio.

**INVENTORS!** Don't sell your invention, patented or unpatented, until you receive our offer. Write Universal Inventions, Box 298, Marion, Ohio.

**IF** your invention is adaptable to promoting we will contract for selling on cash or royalty. Free booklet outlines royalty rates, requirements. Kessler Corporation, C-77-IW, Fremont, Ohio

**COMPARE** offers, then deal with Inventors Guidance Service, Box 451B, Calimesa, California.

**INVENTIONS** Wanted: "Patented"—"Patent Pending." 29 Years experience Promoting Inventions. National Service Bureau, 3122 Meramec, St. Louis 18, Missouri.

**INVENTIONS** Wanted for immediate promotion-patented; unpatented. Outright cash or royalties! Casco, 309F Medical Science Building, Washington 5, D. C.

**NEW** Products wanted for manufacturers. Free information. Ketchum's Advertising, B-1058-C, Springfield, Illinois.

**INVENTORS' Complete Service.** Cash-Royalties Sales. Inventions Researched. Patent Development Engineering. Free Invention Certificate. George Spector, Licensed Invention Engineer, 3615 Woolworth Building, New York.

**INVENTORS!** Outright cash sale or royalties for your inventions. Patented. Unpatented. Constant demand from our client manufacturers. Write United States Invention Brokerage, 78 Wall Street, New York 5, N. Y.

**INVENTORS!** Consider our offer first before selling or licensing your invention on a cash or royalty basis. Patented. Unpatented. Inventions on Demand, 79 Wall Street, New York 5, N. Y.

**INVENTIONS** Wanted for Manufacturers. Free Details. Write Allen, Dept. D, 712 Davis Bldg., Big D, Dallas, Texas.

**INVENTIONS** wanted now by my Manufacturer Clients. Patented. Unpatented. Write Gilbert Adams, Patent Broker, 80 Wall Street, Financial District, New York City.

## 64 MODELS, MODEL SUPPLIES

**SHIP** Models. Most complete line in New England. Kits, fittings, plans, books, tools, engines, motors. Illustrated catalog 35c. James Bliss and Co., Inc., Dept. PS, 342 Atlantic Avenue, Boston 10, Massachusetts.

**"POWER** Drives Handbook"—36 pages illustrating many types motor drives for model autos, boats, displays, turntables, etc. Mail 25 cents cash, returnable first order \$3.00 or more. Wilson's of Cleveland, Dept. PS, P. O. Box 8995, Ft. Lauderdale, Fla.

**SHIP** and yacht model fittings; blueprints. Send 40c for illustrated catalog listing hundreds of items. A. J. Fisher, Inc., 1002-2 Etowah Ave., Royal Oak, Michigan.

**SHIP** Model Kits and fittings: clippers, frigates, etc. Catalog, paint-tool list, book list, 25c. Model Shipways, Box 85, Bogota, N. J.

**"ST"** Steam Engines, Fittings Catalog 15c. Ship Models, Ltd., Andover, Mass.

**ROCKET** Supplies, Nozzles, Cones, Tubes, Specials Also Made. Catalog 10c. Sky Mfg. Co., Mineral Point, Pa.

**PARACHUTES.** Nylon, government tested. 28" diameter. Can carry 5 lbs. Excellent for rockets. Only \$1.95. Liquid Rocket, 6 ft long. Will carry 10 lbs. Plans only \$2.00. Missile Research, Station 1, Provo, Utah.

**STEAM** plants for model boats, catalog 40c. Anton Bohaboy, 2297 Price, Rahway, N. J.

**ROCKETS**—Complete Plans, 1 & 2 stage, 3/4" to 3 1/2" diameter, see ad page 34.

## 64A ENAMELS, PAINTS & VARNISHES

**PAINT** Mixer, heavy duty agitator, fits any electric drill \$1.00 postage paid. Modern Specialty Manufacturing, 6912 Sheridan Road, Kenosha, Wisconsin.

## 64B ELECTRIC TRAINS

**IVES** wanted. Describe Price. Tihamer Geng, 28 Division St., New Brunswick, N. J.

## 65 HOME CRAFTSMAN

**FREE** "Do-It-Yourself" Leathercraft Catalog. Tandy Leather Company, Box 791, S36, Fort Worth, Texas.

**FOUNDRYETTE**, 2400° F. 1 1/2 to 48 lb. capacity. Free Circular. Kansas City Specialties Co., Dept. S-7, Box 6022, Marysville, Kansas.



**BARBEQUE** Set Plans 50c. Ware Cabinets, West Street, Foxboro, Mass.

**LEARN** Jewelry Making at home. Inexpensive Art Metalcraft course teaches how to make all types cuff links, earrings, tableware, etc. of silver, gold, copper. Send postcard for free booklet. Interstate Training Service, Dept. L-2, Portland 12, Oregon.

**!!FREE!!** Leathercraft catalog. Hundreds of new items. Write MacPherson Bros. Leather Company, Dept. A, 730 Mission St., San Francisco 3, Calif.

**FREE** Leathercraft Catalog — Quality Kits, Leathers, Tools. Handicrafters, Montrose, Calif.

**SQUAREKNOTTERS:** Make belts, handbags, lanyards, dog leashes, etc. Special offer! Beginner's book, catalog and quality cord samples 25c. P. C. Herwig Co., Dept. 71-P7, 39 Henry St., Brooklyn 1, New York.

**WALNUT, Cherry, Silver Maple,** kiln dried Lumber, Squares Blocks and Picture Frame Moulding. Midland Lumber Co., Box 262, Savannah, Mo.

## 66 DO IT YOURSELF

**AIR** Conditioners, Home, Automobile. See Kool Engineering ad, page 41.

**NOW!** Sharpen Electric Shavers Better Than New! Faster, Closer Shaves. (Easy 3-Minute Method) Satisfaction Guaranteed. \$1.00 Speeds Special Instructions And Compound. Gemery, 365 Long Hill Ave., Shelton, Conn.

**MANUAL** Blocks, Bricks, Tiles, your Home. Establish own Insulcrete Business; cheaper than concrete. Machine, Franchise included. National Insulcrete Corp., 50 Waterview Ave., Massapequa, New York.

**TECHNICAL** Bulletins tell you how! 50 subjects; electrical, chemical, home. \$1.00 each. Free list. Technical Service, Box 313, Barrington, Illinois.

**"CREATIONS** In Fiberglass" Now! A complete manual on how the home workman can design and build his own useful and original creations with fiberglass. \$2.00. Creations In Fiberglass, Box 3871, Terminal Annex, Los Angeles, California.

**METAL** Parts Bins Portable! Free! Tommy Lynch, 2330 Springlake, Dallas 34, Texas.

## 67 OLD GOLD, JEWELRY, WATCHES, ETC.

**USED** and new watches \$2 up. Free List. Southern Watches, 5-PS So. Wabash, Chicago 3.

**FREE** catalog. Costume jewelry parts. Supplies. Reasonable prices. Fast service. Guaranteed quality. Unique merchandise. Folsom's, Box 52, Medford 55, Massachusetts.

**HIGHEST** Cash For Old Gold, Jewelry, Gold Teeth, Watches, Diamonds, Silverware, Spectacles, Platinum, Mercury. Free information. Rose Refiners, Heyworth Bldg., Chicago 2.

## 68 TOBACCO & PIPES

**MINIATURE** pipe and catalog. 60c. Herbert, 340 East Park, Huntington, Indiana.

## 70 OF INTEREST TO WOMEN

**MAKE** \$25 to \$35 weekly addressing envelopes. Our instructions reveal how. Glenway, Box 6568, Cleveland 1, Ohio.

**60% PROFIT** Cosmetics \$25 day up. Hire others. Samples, details. Studio Girl-Hollywood, Glendale, Calif., Dept. 1107HX.

**DRESSES** 29c; Shoes 59c; Men's suits \$5.98; trousers \$1.38. Better used clothing. Free catalog. Transworld, 164-H Christopher, Brooklyn 12, N. Y.

**HUNDREDS** Of Bargains Wholesale! Many Name brands. Catalog 10c. Sanchez, Dept. PS-1, 240-22nd Avenue, San Francisco 21, Calif.

**LADIES:** Earn up to \$2.00 hour sewing babywear! No house selling! Send postcard to Cuties, Warsaw 14, Indiana.

## 72 WANTED TO BUY

**CASH** for used correspondence courses. Send description. Wall, Box 141, Byars, Oklahoma.

## 73 WEARING APPAREL

**HANDWOVEN** Harris tweed only \$1.40 per yard. Any length supplied. Write airmail for free patterns. MacGillivray and Company, Weavers, Benbecula, Outer Hebrides, Scotland.

## 75 TATTOOING SUPPLIES

**LEARN** profitable, fascinating Tattooing. Illustrated Information \$1.00. Zeis, 728-B Leslie, Rockford, Illinois.

## 77 GEIGER COUNTERS & TREASURE FINDERS

**GOLD-Silver** Detectors, Geiger Counters. Violites for tungsten, etc. Best available. Guaranteed. Information Free. Delectron, Dept. 38, Sylmar, Calif.

**TRANSISTOR** Treasure Detectors, underwater detectors. Many models. Free catalog. Gardiner Electronics Co., Dept. 1, 2545 East Indian School, Phoenix, Arizona.

**DISCOVER** buried loot, sunken treasure, gold, silver, coins; battlefield and ghost town relics, with powerful transistorized locators pioneered and perfected by Goldak. Low as \$79.50. Free, exciting information; literature on maps. The Goldak Co., 1544 West Glenoaks Boulevard, Glendale 1, California.

**UNDISCOVERED** Wealth! Transistorized M-Scope detects gold, silver, jewelry, etc. Lightweight, guaranteed. From \$59.50. Easy Terms. Free Catalog. Fisher Research, Dept. C-2, Palo Alto, Calif.

**TREASURE!** Map, Handbook 25c. Locators. Howe, 811 Kansas, Atchison, Kansas.

**MYSTIC** Antenna reveals secrets of nature's electronics! Locate hidden springs, water, gas, sewer lines, buried treasure! Works indoors; outdoors. Saves work, money! Easy to use. Fun for experiments! Details free. Stillwater, Box 337-X, Morris Plains, New Jersey.

**JUST \$3.00!** Locate Metal even though many feet underground, effective at known depths of 60 ft. Learn to use in minutes. Easy instructions, no experience required, weighs less than eight ounces. Used by many professionals in preference to an electronic detector. Order today! Moneyback guarantee! COD, or we pay postage if you send \$3.00 check or money order. Plastino Mfg. Co., (Dept. S), 6907 West 12th Ave., Denver 15, Colo.

**METAL** Locator Kits and Assembled Models from \$39.90. Transistorized and Underwater Models Available. Free Catalog. Electronic Applications, Dept. S, Box 8, Arlington 10, Virginia.

## 78 WATCH REPAIRING

**WATCH** and clock repairing books. Free catalog. North American, 2320-BU Milwaukee, Chicago 47, Illinois.

**WATCHES** repaired, cleaned, \$3.95 guaranteed. Lan's, 17 South Center, American Fork, Utah.

## 79 MISCELLANEOUS

**COLORCADE** Water Fountains, Automatic Stroboscopic Color Effects. 809 Delaware, Berkeley, California.

**JET** Turbine Raindrop Garden Hose Nozzle, Last Word; Patented, \$1.00. Refundable. Swan Co., 858 "G", Coronado 18, Calif.

**FREE!** Money-making offers; catalogs, bargains, samples. Your name listed on Giant mailing list, only 25c today! Davis, Safety Harbor 38, Fla.

**BOOKS** on antiques and their prices. Free circular! R. Warman, Publisher, Uniontown, Penna.

**"HOMEBREWED** Wines, beers". Instructions, Formulas—\$1.00. Dean's, Box 40-PS, Elberton, Georgia.

**RECEIVE** Mails—Offers From Everywhere. Samples, Catalogues, Magazines, Bargains. Get Listed 25c. Rorick's, Cincinnati 26, Ohio.

**PRESS** Card—Authentic—Many Uses. Only \$1.00. J. Monath, Box 3079, Grand Central Station, N. Y. 17.

**MAKE** Wines, Brandies, Cordials, Beer. Full Instructions. Trade Secrets \$1.00. Rorick, Cincinnati 26, Ohio.

**LOANS** Entirely By Mail—\$600 or less for any purpose. Strictly Confidential. Repay in 24 low monthly payments. Employed men, women eligible anywhere. Write: Budget Finance Co., Dept. I-60, 114 S. 17, Omaha 2, Neb.

**OPPORTUNITIES**—Bargains—Services!! That's what you find in these classified advertising columns. Advertisers here offer numerous products, services and opportunities. Read the ads. You may find just what you have been looking for. You can make or save money by answering these ads. (Write directly to the advertiser—not to Popular Science).

**FREE!** Movie Camera. Information 10c. Loden, 928 West Lee, Kingsville, Texas.

## 80 PERSONAL

**MEXICAN** Legal Matters. A. Espejo, Box 217, Tijuana, Mexico.

**"RULE** Others with your Thoughts." Telepathy. (Adults.) Write: Clarion, Box 9309-S6, Chicago 90.

**POSITIVE** Popularity! Simplified Plan \$1.00. Shelly Publications, P. O. Box 201, Brightwaters, New York.

**LOANS** By Mail. \$50 to \$600 For any purpose. Employed men and women eligible. Confidential. 2 years to repay. Write for free loan application. American Loan Plan, City National Bldg., Dept. PS-6280, Omaha 2, Nebraska.

**BACKACHE** Problem?—Proven Successful Relief. Costs nothing unless satisfied. Free Literature. L. Stein, 311 Delsea Dr., Woodbury, N. J.

## 80A REMAILING SERVICE

**BENSONS**, 152 West 42, New York 36. \$3.00 month no remailing charge.

**SECRET**, Confidential, Prompt Remailing. Forwarding, 25c. Monthly rates \$3.00. Antoinettes, 110 E. 177th St., New York 53, N. Y.

**FROM** Madrid, Spain, \$1.00. Month \$4.00. Lambert, USAF Commissary, APO 285, New York.

**SECRET** Mail Address. \$3 Month. Hedgpath, Box 830, Alhambra 24, California.

**BUSINESS**—Personal mail receiving forwarding \$3.00 month 25c each. Arroyo, 1531 N. 70 Ave., West Hollywood, Fla.

**CONFIDENTIAL**, mail receiving-forwarding 25c per letter Dependable. Jonell, Box 943, Wenatchee, Wash.

**REMAILS** From Suburb Of Chicago, 25 Cents Per Letter. Lyons, Box 22, Villa Park, Illinois.

**SAN ANTONIO** Remail 25c. Confidential, prompt, dependable. Monthly \$3.00 postpaid. Michael, Box 11447, San Antonio 8, Texas.

**ENGLISH** Remail, Forwardings: 25c, airmails 50c, stamps included. Earnshaw, 52 Kings Road, St. Leonards, Sussex, England.

## 80B LOANS BY MAIL

**BORROW** By Mail. \$100-\$600. Anywhere. Air Mail Service. Postal Finance, 221 E. & C. Building, Dept. 11, Denver 2, Colorado.

**BORROW** \$50 to \$600 By Mail. Quick, Easy, Private. No Co-Signers. Repay in 24 small monthly payments. For the amount you want write today to Dial Finance Co., 410 Kilpatrick Bldg., Dept. G-1, Omaha 2, Nebraska.



**It's up to you!** The Army's new "Choose-it-Yourself" System lets you pick valuable training before you enlist. Here's how it works: **1. Choose** before enlistment. Choose your training from fields like Auto Mechanics, Missiles, Aircraft Maintenance, Meteorology, Surveying—and many more. **2. Qualify** before enlistment. Take aptitude and physical exams to qualify for the training you've chosen. **3. Know** before enlistment. If you qualify, you know you'll get the training you want. Your choice is written into your future Army record—guaranteed before you enlist. **Choose, qualify, know—this week!** Ask your Army recruiter to show you his complete list of available training fields.

**Want training in Auto Mechanics? Construction? Electronics?**

## choose-it-yourself before enlistment



*Auto Mechanic and Instructor*

CHOOSE IT



YOURSELF VOCATIONAL TRAINING SYSTEM

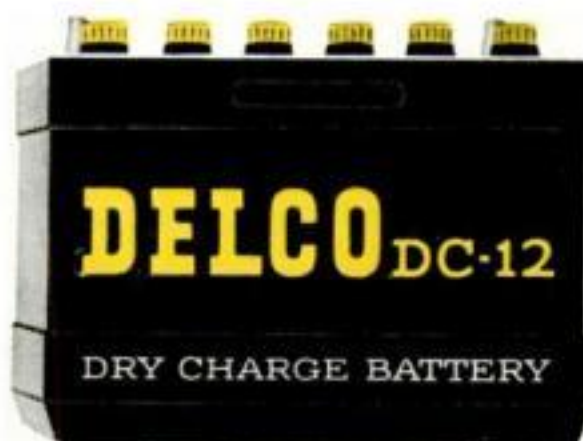
# US ARMY





Things really jump when you start with a Delco Dry Charge battery. It's got reliable power plus stamina. You need both—for today's high compression cars, loaded with accessories, demand an awful lot from a battery. In fact, the electrical load has *tripled* in the past 10 years! That's why you're wise to replace with Delco DC-12, the battery that's designed for modern car requirements. More new cars come factory equipped with this power-packed Delco. It's a dry charge battery, too—your assurance of

**100%**  
**FRESH**  
**STARTS**



3- AND 12-VOLT MODELS Quality built by Delco-Remy, first in automotive electrical equipment

... distributed nationally through





# BUY IT BY THE SEAT OF YOUR PANTS

Behind the wheel, that's the place to buy Valiant. You'll feel real skedaddle, 101 horses worth, from an *inclined* engine that stretches regular gas like rubber bands. You'll feel a ride like nothing ever, mill-pond smooth, quiet as a clam. It's called Torsion-Aire, and it's teamed-up with a fully unitized body, rust, rattle and squeak proofed. You'll have an alternator electrical system that makes your battery last longer, a trunk as big as a cave (25 cubic feet of it), and plenty of traveling room for a family of six. Like what you read? You'll like driving Valiant better. Go see the man who sells 'em. You'll like him too. Valiant, the car you'd want at *any* price.



## Valiant

KING OF THE COMPACTS